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LEARNING BY TELEVISION.

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IN SPITE OF ITS PROVED EFFECTIVENESS, INSTRUCTIONAL TELEVISION (ITV) HAS NOT REALIZED ITS FULL POTENTIAL AS A TEACHING MEDIUM. THE AUTHORS REVIEW THE HISTORY OF ITV, POINTING OUT THE REASONS FOR ITS PAST FAILURE AND ENUMERATING THOSE FACTORS WHICH MAY LEAD TO THE FULFILLMENT OF ITS PROMISE. FREE COPIES OF THIS DOCUMENT ARE ALSO AVAILABLE FROM THE FUND FOR THE ADVANCEMENT OF EDUCATION, 477 MADISON AVENUE, NEW YORK, NEW YORK 10022. (AD)

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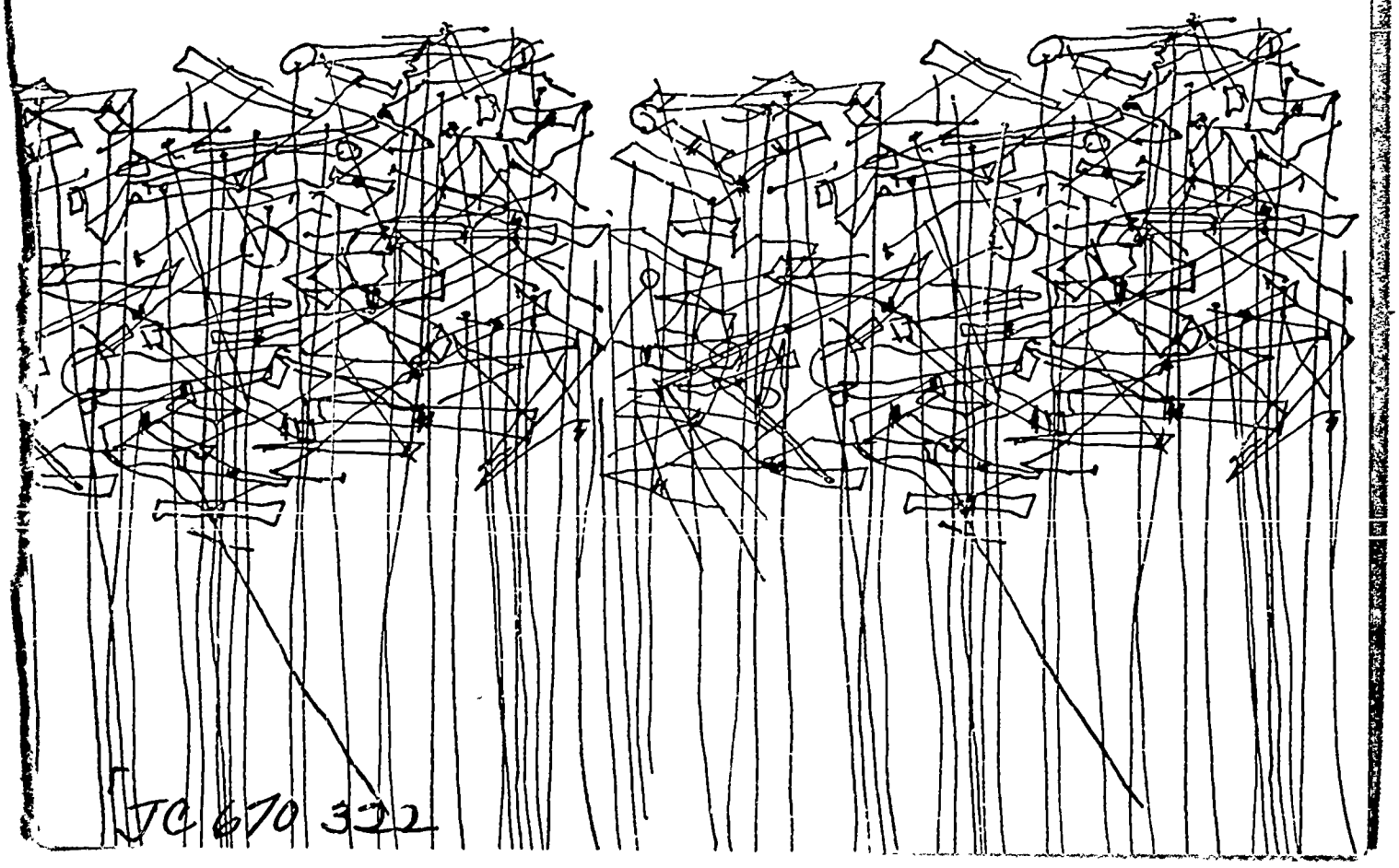

Learning by Television

by Judith Murphy and Ronald Gross

Academy for Educational Development, Inc.

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Preface

Change in education does not often come about smoothly—through empirical research, logical analysis, sweet reason, or a count of hands. Educational change is, more often than not, hotly contested. While most educators sit out the struggle, the leaders divide into those who feel threatened by the new ways, and those who complain that change does not come fast enough.

So it has been with one of the most controversial of innovations, televised instruction. Some denouncers sincerely believed that television threatened to take over the whole educational program, reducing the rich variety of the classroom to the flat surface of a tube. In an age of education, many teachers seemed to fear technological unemployment. Some humanists foresaw automated education, mechanized teaching, and robotized students.

Proponents, however, viewed television in the historical context of communication media, each of which has significantly affected the process of education. For them television was a new way of communicating: the latest in a series of advances that have enhanced man's prospect for survival by permitting him to share the knowledge and understanding of other human beings. Since education is largely a matter of communication, they argued, television—like books, records, and radio before it—could be used in teaching.

Because of the critical and rapidly growing teacher shortage after the second world war, the Fund for the Advancement of Education and later the Ford Foundation became interested in supporting proposals and experiments designed to make more efficient use of teachers' time and talents. Among the projects supported were those using teachers' aides; team teaching; various technological innovations such as television, tape, and teaching machines; and comprehensive programs using a variety of methods to extend the reach of the effective teacher. As vice president of the Fund from the first year it was organized, and as a member of the board, I was involved in

the making of grants for all these activities, and naturally followed their progress—and those supported by other agencies or by local school systems—with great interest.

Starting with a modest grant to help teachers at Montclair State College transmit some fifth-grade American history lessons by closed-circuit television to nearby schools, the Fund and Foundation over a ten-year period broadened and deepened their role in instructional television. The Fund, with its inherent flexibility and its commitment to educational experimentation, led the way by seeking out those educators ready to innovate. As promising opportunities arose for large-scale support, the Foundation entered with its more substantial resources. This one-two punch was most effective in testing a variety of approaches at various educational levels: county-wide in-school programs in Washington County, Maryland; state-wide school use in Alabama; city-wide junior college courses in Chicago; a major university program at Pennsylvania State University.

After the experience with these state and regional efforts, it was natural to encourage development of some national programs, so the National Program in the Use of Television in the Public Schools, "Continental Classroom," and the Midwest Program on Airborne Television Instruction were supported.

Just a dozen years ago perhaps a thousand students were receiving some instruction by television. Today the medium is used to instruct millions.

This report is the work of Judith Murphy and Ronald Gross, experienced writers and consultants on education and co-editors of the recent *Revolution in the Schools*. In 1963 Mr. Gross studied educational experiments under a grant from the Philip M. Stern Family Fund.

In the present report the authors have examined television's role in instruction. Their assignment was not to produce an exhaustive survey, definitive statistics, or scientifically rigorous conclusions. Rather, it was to look at televised instruction afresh—to view it clearly, in context, and with judgment. They have, therefore, had to be selective, and much valuable work and many talented and devoted people have had to go unmen-

tioned. Nevertheless, the authors have succeeded in conveying the diversity of effort in this field, how the medium works, what the leading practitioners and critics think and feel about its achievements and failures, and what the future may hold. Rightly, they have focused not on television but on education.

As Murphy and Gross show, the use of television in the classroom for a decade and more has demonstrated incontrovertibly that students can and do learn quite as well from television as they do from conventional instruction. However, the practical experience of school and college educators with the television medium has been quite mixed. As a result, televised instruction has not taken a central position in education. Rather, it is still a marginal enterprise.

The findings reported in this study indicate that there are two prime causes for instructional television's limited acceptance: the quality of the transmitted instruction, and the way it is used in the classroom.

As applied to education thus far, television has largely put current modes of teaching on the screen. The result has been widespread disenchantment as the mediocre level of much instruction has been exposed to professional and public scrutiny for the first time. The need for imagination, ingenuity, and innovation in the whole process of education has been forcefully demonstrated.

The primary goal of ITV in the future must be to raise quality and improve classroom utilization. Here, as elsewhere in education today, mere expansion of present practices is not enough. The way forward is necessarily a new way. To create the new some of the old must be constructively destroyed.

The outlook of this report is optimistic. It shows that instructional television now stands at the most significant crossroads in its history. Recent developments — governmental, technological, educational — have set the stage for advance to a new level of usefulness and excellence. Opportunities have opened to apply television to new educational challenges, to intertwine television fruitfully with other new media, and to undertake new experiments with augmented research funds.

 Mr. Bundy's first major announcement as president of the

Ford Foundation on the possibilities of the use of satellites for ETV broadcasting is a thrilling case in point.

As one who has been deeply involved with much of the experimentation from the early 1950's to the present time, I am concerned about the future of American education and the possibilities of applying what we have learned here to the education of people throughout the world. This report reviews the early development of one innovation. We are now ready for the next stage, which calls for a thorough, dynamic effort to improve the quality of instruction, not just over television, but throughout our entire educational system, with television as one of the many instruments that can be used to give each child, wherever he may live, the opportunity to become all he is capable of being.

Alvin C. Eurich, President
ASPEN INSTITUTE FOR HUMANISTIC STUDIES

The Unfinished Experiment

After more than a decade of intensive effort and the expenditure of hundreds of millions of dollars, has television made a real impact on America's schools and colleges? Has it made a worthwhile contribution to education?

The short answer to such a sweeping question would probably have to be "No." Whether measured by the numbers of students affected, or by the quality of the product, or by the advancement of learning, televised teaching is still in a rudimentary stage of development. The medium can take credit for helping understaffed schools to cope with ever increasing enrollments. But television has not transformed education, nor has it significantly improved the learning of most students. In short, TV is still far from fulfilling its obvious promise. Television is *in* education all right, but it is still not *of* education.

All such generalizations, of course, need to be qualified if they are to be meaningful. This report attempts to provide the qualifications in its evaluation of televised instruction today, highlighting the diversity of the enterprise and its noteworthy achievements and failures. In so doing it will pay particular attention to important trends that forecast the future, and to the use of television for instruction in schools and colleges. Beyond its scope are the cultural and public-affairs programs on both ETV[1] and commercial television, such as the superb CBS White Papers; the noncredit courses for adults, such as the fine basic training in Russian produced by WETA in Washington, D. C.; the seminar-type programs for training purposes, such as those developed by the armed services and business firms; the programs designed to serve particular community needs, such as California's televised highway commission hearings or Houston's airing of school board ses-

[1] In general, the term "educational television" (or ETV) covers all noncommercial television. In American usage, however, "ETV" is sometimes applied more narrowly to cultural and educational programs for at-home viewers in contrast to "instructional television" (or ITV), which is a term used to describe formal school, college, or university instruction via television.

sions; the ambitious series titled "Metropolis — Creator or Destroyer?," produced by National Educational Television (NET) to jolt city dwellers out of their complacency; and community-action programs, such as St. Louis' "TV Town Meetings," where viewers phone in questions. Such programs are shining examples of educational TV at its best.

This report is concerned primarily with the process of educating young people and showing how televised teaching may be improved to meet some of the challenges facing education in the years ahead. Television is one of several promising tools now available to strengthen the educational system and make it more responsive to individual and social needs.

Television *works* as an educational tool. There is no question of its validity as a medium of instruction. Students can learn from television, as they can learn from teachers and texts, radio, recordings, and films. But educators are still far from grasping the real nature and potential of television.

Indeed, there is evidence that undue concentration on the medium as such has limited television's usefulness. Television has usually been introduced into schools and classes without changing anything else, just as movies were used in the assembly programs of an earlier day. Few educators have used the new technology to help bring about a basic change in instruction, and there has been little relating of television to other new media and technologies.

As a matter of fact, the most conspicuous result of television teaching has been an incidental byproduct: the medium has displayed in public what had heretofore gone on behind too many closed classroom doors—uninspired teaching. But the medium should not be blamed for magnifying the basic flaws in instructional procedures. As it has been used to date, television cannot upgrade the quality of American education; it can only alleviate the problems created by having too few teachers, too many students, and swelling curriculums.

History in Brief

Television has helped to transform postwar America. The spectacular success of commercial TV, once the restrictions of

World War II were lifted, altered America's leisure-time patterns almost overnight. The implications of the new medium for education were great.

Following a few college experiments in the 1940's and even earlier, TV as an instructional tool was tried out at all levels of schooling throughout the country in the mid-1950's. At this time the general public had become aware of the acute shortages of teachers and space, but was only beginning to recognize the more basic qualitative problems.

The obstacles to the adoption of televised instruction were formidable. One was its cost—hard to determine but obviously large, if only for the hardware. Another was its complex technology. Another, and more critical, was the very newness of television. The medium's great success in entertainment made it suspect to many intellectuals, including teachers and educational administrators; since they disdained to receive Milton Berle in their own living rooms, they also excluded the "idiot box" from their classrooms.

Education is slow to accept innovation. It is a widely accepted fact that, on the average, an educational innovation takes fifty years to trickle down to the mass of schools and colleges. Earlier technological tools of communication, with obvious implications for learning, have not to this day become an intrinsic part of education. Films, radio, recordings, etc., play little more than token roles in instruction. Acclaimed in their day as TV is today, these devices have for the most part never been used with any real imagination.

The fate of these earlier innovations seemed portentous for TV. For one thing, there was the possibility that the new medium would also fail to be fully developed. For another, there was the hostility of the audio-visual establishment itself —by now a little bureaucracy on the margins of education, and hardly exhilarated at the advent of a glamorous device that threatened to overshadow many of the older "new" media.

That televised instruction has achieved even its present modest success is, perhaps, a miracle. The achievement has taken massive pump-priming from private foundations and government. The Ford Foundation alone has made grants in the

neighborhood of $100 million to all phases of educational television, at first through the Fund for Adult Education for educational television stations and programing, and later through the Fund for the Advancement of Education to schools and colleges. The federal government's support has added approximately another $100 million in equipment to the country's ETV facilities.

For instructional television (ITV) to get where it is today took the combined efforts of enthusiasts from various fields and disciplines; veterans of educational film and radio, communication specialists in the universities, foundation executives, workers in adult education, private citizens concerned with the quality of education, visionary school superintendents, creative professors and teachers, and fugitives from commercial television. Above all, perhaps, it took a blissful unawareness of enormous obstacles. Some early enthusiasts seemed to think that introducing television into education would be a relatively simple, though expensive and disruptive, enterprise. They were to find that this innovation would greatly tax the skill and knowledge of its practitioners.

The outlays of money and effort were expended for a variety of objectives: first, to put educational programs on commercial stations; later to stimulate in-school programs, both by broadcast and closed circuit; then to establish, equip, and staff noncommercial TV stations and to provide evening and out-of-school programs. As previously stated, this report is concerned chiefly with in-school television, with what is generally termed "instructional television" or "televised instruction." ITV, which will be used here for convenience, must be treated in the context of educational television, as so much in-school television emanates from ETV stations and is affected by the personalities and power behind them.

For many reasons, such as the nature of the medium itself, the massive campaign that launched it, and its connection to the world outside education, ITV has escaped the fate of educational radio and film. However, it still occupies a marginal position in American education, despite the ever increasing numbers of students it reaches.

Instructional Television in the Balance

Instructional television's success as a tool for educational innovation and improvement hangs in the balance. Favorable portents, though, seem to outweigh the unfavorable. Governmental interest and support are at a new high; federal grants have spurred belated state activity. More important, Washington is committed to educational innovation as never before. This was the dominant theme of the White House Conference on Education convened by President Johnson in the summer of 1965. The chairman of that conference was John Gardner, president of the Carnegie Corporation, who is now the Secretary of Health, Education, and Welfare. On the day he was appointed, Gardner joined forces with James B. Conant, Francis Keppel (then U. S. Commissioner of Education), and former Governor Terry Sanford of North Carolina to persuade the Governors' Conference to support educational innovation, including television.

The physical apparatus of ITV is growing prodigiously. Televised instruction has unquestionably established important beachheads all over the country and improved instructional offerings in places as diverse as Boston, San Francisco, Denver, Chicago, Washington County (Maryland), and the backwoods of South Carolina and Nebraska. Its educational value has been proved in many ways: in advanced medical and dental training, in helping to teach French and Spanish to hundreds of thousands of elementary-school children, in providing entire junior-college degree programs for students at home or on campus, in coping with large survey courses at many state universities, and in improving the education of prospective teachers.

On the other hand, many brave and costly experiments have petered out completely or bumbled along in low gear, without inspiring others of the kind. Sometimes the basic idea proved faulty; in other cases the execution failed to generate sufficient enthusiasm; occasionally extraneous factors blocked success. "Continental Classroom," which brought high-level college courses to students throughout the nation, was dropped after a few seasons. No state has followed the lead of Texas in creating

a state-wide broadcast facility to train teachers (and Texas itself let the program lapse). Despite a variety of demonstrations that television could help solve the mounting crisis in higher education, faculty resistance continues high, and ITV has made small headway in colleges and universities. Despite a nationwide program that proved television's utility in teaching extra-large classes and thus freeing teachers to work with small groups and individual students, most of the hundreds of schools involved have reverted to the old familiar ways and use television only in conventional instructional settings.

Unfortunately, many experiments have been evaluated with scorecard simplicity as "success" or "failure." Such judgments conceal the reasons why TV is sometimes useful, sometimes not. Even more important, they obscure the wider implications of ITV for American education.

As television machinery has become commonplace, it has been used less as a means of innovation and more as a simple extension of practices that have been criticized for years. Teachers in the schools and colleges that use television for instruction are taking it for granted; ITV, it appears, has lost the excitement along with the fearsomeness of novelty. There is evidence of a comparable attitude among students, too.

Is ITV going to settle for mediocrity, reproducing its easy successes and continuing its marginal role? A number of its most ardent practitioners sense this danger. One of the medium's elder statesmen (even the eldest are barely fifty) is so conscious of ITV's potential danger that he espouses "creative destruction." Like many of his colleagues, he would like to see the old molds destroyed lest the new federal and state support help to entrench the conventional product, which instructional television, by and large, has so far generated. These leaders view instructional television not as an end in itself, but as one way of enhancing the education of young people—and a potentially crucial one. If they attack the establishment in their chosen field, it is because they feel their primary allegiance not to a medium but to the educational process as a whole.

The ITV Enterprise

Let's not overlook the fact that the kind of television hardware you choose does influence the kind if not the quality of instruction you produce: broadcasting with its channel limitations leads almost inevitably to enrichment, or supplemental, programs. Closed-circuit television, with many channels available, is much more adaptable to direct or even total teaching.

GEORGE BAIR, *Educational Director*
South Carolina ETV Center; 1965.

If you don't pay attention to organization you soon find that it is determining the philosophy and goals of your enterprise.

JOHN W. GARDNER, *Secretary*
Department of Health, Education, and Welfare; 1965.

One cannot gauge the impact of television on education without some knowledge of the technological and organizational apparatus involved, any more than one can understand school curriculums without considering the textbook industry's operation. George Bair makes a powerful point: different kinds of technology and organization do open or close different possibilities for teaching and learning.

A medium as potent and versatile as television is not just going to slip into the classroom like a different shade of blackboard. The job of choosing educational resources for instruction today requires the educator to juggle big budgets and to deploy a variety of resources on a wide scale; in the area of televised instruction he must consider ETV stations, closed-circuit systems, regional compacts, other audio-visual technologies, and a myriad of additional factors to produce the answer to his particular students' needs. The late Lynn Kalmbach, who died in 1965 at the height of a distinguished career as director of South Carolina's ETV center, pointed out that success or failure in an ITV project often hinged on "sweating, maneuvering, politicking," and that it was idle to seek or pro-

pound a model setup. "You have to work out and judge each project in its unique context, in relation to its own problems," he said. "You can't set up a model and sell ETV or ITV to people through technical manuals or organization charts. Any group that wants to get into the field ought to look around and find a successful project whose context resembles their own. Then they should modify it to suit their particular requirements and resources."

A Pluralistic System

Foreign observers are often taken aback by their first introduction to the American educational system. They are shocked to discover that there is really no "system" at all. Instead, in the lower schools there are thousands of local systems, differing from state to state and from city to suburb to rural district. There is also a whole parallel system of parochial schools that educate millions of American children. In higher education there are over 2,000 colleges and universities, public and private. American educators recall, with mingled awe, admiration, and repugnance, the French minister of education who told a group of U. S. schoolmen: "At this time of morning I can tell you that every third grade class in France is studying the subjunctive of the verb 'to be.' "

A foreign observer who comes to this country with the specific mission of examining educational television will be confounded by the array of local hierarchies. One such observer, Lawrie Lawler of London's Centre for Educational Television Overseas, who surveyed the ETV scene in the United States in 1965, was dazed by the plethora of "authorities" he had to consult in regard to the complex American picture. He said later that the advice he got "though generously given and of great interest, proved to be somewhat contradictory."

Educational television, and in particular formal course work via television, adds it own peculiar complications to the over-all educational scene. One of these is that ETV stations are run by administrators who are broadcasters rather than educators. After all, an understanding of education and the learning

process has never been a prerequisite for becoming an executive in an educational television station.

There are now 115 ETV stations in the United States; this is an impressive growth record when one considers that in 1950 there was no such thing as an ETV station; only one station was licensed to an educational institution (WOI-TV at Iowa State College). By 1960 there were sixty ETV stations. The future promises an even greater increase. Growth has been steady and solid, despite endemic financial troubles. Only two ETV stations have ever gone dark.

An ETV station's income from school programing is the most secure foundation of its solvency. It is not surprising, therefore, that most ETV stations offer this service, which accounts for close to half their broadcast hours. The average station broadcasts little else but instructional programing during the daytime.

Sometimes ETV stations play no active role in televised instruction but act only as transmitters. Some of the smaller stations neither produce programs nor work with the schools, but simply relay programs obtained from other stations or from one of the tape libraries.

The Diversity of ETV Broadcasting

School services differ markedly from one ETV station to another as a result of differences in organization, history, setting, and kinds of resources. Secondary schools in North Carolina, for example, are provided with TV programs sent live from Station WUNC-TV, which is operated by the University of North Carolina. For eight years this station has broadcast a number of high-school courses. Production for the past six years has been controlled by the state's Department of Public Instruction, executed under contract by WUNC's staff, and financed by the state's education budget.

North Carolina now has two ETV transmitters in operation and expects to have three more by the end of 1966 for full state coverage, purchased with $1,250,000 in state funds plus additional federal grants. Going against the dominant trend, North

Carolina produces no elementary-school programs of its own. Moreover, it continues as it began, with the same four secondary-school courses, five days a week. Like many ETV stations, WUNC broadcasts Heath de Rochemont's "Parlons Français" series for the elementary grades. With this exception, all programs are local and presented live.

Roger Koonce, who is now WUNC's operations director, had for some years been in charge of school programs. He and his colleagues in North Carolina make a virtue of the technical necessity of broadcasting their programs live: "It makes it easier to keep current," he explained. "When a crisis occurs in Kashmir or Indonesia an hour before broadcast, the world-history teacher can prepare a five-minute sequence to insert. We think this makes the kids in the classroom realize that the TV teacher is just as real and alive as their classroom teacher, that she lives in the same world as they do and reads the same morning paper. She isn't off somewhere in TV-land."

In contrast to WUNC's emphasis on live programing, Boston's famed WGBH, a community station whose fourteen sponsors include Yale as well as Harvard, relies on tapes. WGBH produces school programs for "21 Inch Classroom," an extension of the state's Department of Education, and also broadcasts a few programs obtained elsewhere. Major production costs are covered by assessing member school systems a low 25 cents per pupil (the U. S. median is about $1). Subscribers now include about 200 school systems, with about 700,000 pupils, in Connecticut, Rhode Island, and New Hampshire, as well as Massachusetts. With money already set aside, the University of Massachusetts expects to obtain a channel and erect a transmitter that will bring "21 Inch Classroom" to new audiences in the western part of the state. Plans are in the works to extend coverage to all of Massachusetts.

Whereas the North Carolina project grew out of basic educational gaps in rural high schools, the WGBH in-school programs stemmed from a 1956 decision of educators in suburban Boston to use television for selected high-quality supplementary courses. Boston's programs concentrate on the elementary schools. They are taped not too far in advance of broadcasting.

"In this way," says Gene Nichols, until recently executive producer of the school program and now with Eastern Educational Network, "staff members can go out in the field and see how the programs actually work in the classroom. Maybe we find, for instance, that visuals aren't coming across—or that a new studio teacher has some unfortunate mannerism that impedes her on-screen instructional impact. With only the first few programs taped, we can work to correct these flaws as we produce and tape the rest of the series."

An entirely different kind of operation in Chicago illustrates how programing may be radically influenced by new technology and projects outside the community. Chicago's station WTTW broadcasts school programs over a ten-county area as agent for a compact of school systems called CAST (Chicago Area School Television, Inc.). "The goal has always been to produce programs of our own," says Marjorie Vaseff, executive secretary of CAST, "but because we have chosen to offer a large number of courses, including those of Midwest Airborne, over several channels, we've had to delay going into production ourselves." Since 1964, CAST has contracted for unlimited access to the taped courses produced by the Midwest Program on Airborne Television Instruction (MPATI).

Of the 800 schools that belong to CAST, about 10 percent are equipped to receive MPATI programs direct from the airplane, but because of reception and scheduling difficulties, very few of them do so. The great majority of CAST schools receive all programs, MPATI's included, over WTTW. An increasing number of schools are installing the equipment needed to get the programs over WXXW, Chicago's new ultra high frequency station. CAST, which concentrates on the elementary schools, also leases series from the tape libraries and from individual producers, like those in Boston and Seattle. Income from the member schools, which was up to about $240,000 in 1965, still did not permit CAST to go into production, but it was hoping to raise the requisite funds from federal or private sources.

Austin's KLRN is a community station, but it is operated by the University of Texas under contract with a lay board. It produces in-school programs supervised by a school compact

and financed, like those in Chicago and Boston, by assessments on the familiar average-daily-attendance basis.

All ETV stations, however licensed, are committed by a ruling of the Federal Communications Commission to provide education and enlightenment to the whole community, not just to students in school or college. All stations perforce rely heavily for their evening programing on NET's subsidized production. Some stations, licensed to a university or a community group, are closely oriented to the public school system. And many school-licensed stations have produced noteworthy programs aimed at the larger community.

Take, for example, Denver. ETV there was sparked by the school establishment itself, notably by an exceptional superintendent, Kenneth E. Oberholtzer, who reserved judgment on televised instruction but encouraged experimentation. KRMA, owned by the public-school system, serves the University of Colorado and the University of Denver, as well as the community generally. On the air since 1956, Denver has beamed educational programs to the community from the start with evening vocational courses put on by the city's famed Opportunity School. In-school television is still headquartered in the school, and supervised by its principal, Russell Casement. By 1966 KRMA covered the whole range of elementary-school subjects, nearly all produced live. The station is gradually moving to tape, however. While many Denver series are distributed across the country, KRMA itself uses very few outside programs. It broadcasts nothing during the school day to the secondary schools, "because of scheduling difficulties," but does offer some out-of-school courses, both credit and noncredit.

Broadcast vs. Closed Circuit

Though educational telecasting did not take hold till well after the close of World War II, campus experiments were under way decades before. As early as 1932, the State University of Iowa's experimental station W9XK began to broadcast educational television programs—probably the first anywhere. By 1948 several other universities were experimenting with

television, including the University of Michigan and American University in Washington, D. C., both of which were producing educational programs for broadcast over commercial transmitters (Michigan's were designed for adult audiences). In 1953 Station KUHT-TV, licensed jointly to the University of Houston and the local school board, became the first ETV station, as such, to be activated. A small army of pioneering individuals and organizations labored, sometimes together, sometimes at cross purposes, to make educational television a reality. Their early efforts culminated in a milestone of ETV history in 1952: the FCC rule establishing a new category, the noncommercial educational television station, and setting aside 242 TV channels for educational purposes.

Before the ETV stations came into being, schools and colleges bought or were given time on commercial channels to air in-school programs, a practice still common. Philadelphia, for instance, broadcast in-school courses for years over commercial station WFIL; when ETV station WHYY was eventually set up, WFIL made the new station a gift of some $1,250,000 worth of broadcast facilities. New York City, which notoriously lacked an ETV outlet until WNDT was finally established in 1962 after harrowing setbacks, broadcast instructional programs for some years over a commercial outlet. In 1965, Los Angeles city and county schools phased out their reliance on a local commercial channel and shifted their in-school programs to the new ultra high frequency (UHF) educational station, KCET. Schools in northeast Mississippi belong to a compact that programs TV lessons over a commercial channel in Tupelo. There are many other similar arrangements.

The chief disadvantage of the broadcast station as the purveyor of school television is that it can use only one channel. Within the limits of a school day, an ETV station broadcasting a variety of subjects to the full range of school grades—even if only the elementary grades—is hard put to it to do a given series more than once or twice a week, particularly with the practical need for repeats. An increasing number of cities now have two educational stations (usually under the same sponsor-

ship); in each case the second channel is used almost exclusively for formal instruction, in or out of school.

As broadcast ETV continued to grow, televised instruction also developed along another path, different both in technology and organization. By the early 1950's, Michigan State and a few other universities were experimenting with formal course work over closed-circuit television. Since programs are transmitted, via cable or microwave, exclusively to a particular audience that must be especially equipped to receive them, closed-circuit television falls outside the jurisdiction of the FCC, which regulates only the scarce, limited channels of the public air space. There is relatively unlimited access to channels in the CCTV spectrum.

The advantages are fairly obvious: by using closed-circuit television, a school system or university can be in complete control of audience and programs. It can determine, within limits of talent and budget, not only the content and the quality of output but to a considerable degree the quantity. The famous system that is centered in Hagerstown, Maryland, for instance, can send out six lessons simultaneously over a coaxial cable linking forty-five schools. Educational users of closed-circuit television (and the new 2,500-megacycle service) can thus make more intensive use of the medium than the schools and colleges that depend on broadcasting stations.

To count the precise number of closed-circuit installations in the country is virtually impossible. Since they need no license, there is no central authority responsible for their number and operation. Some estimates are totals of systems rather than of individual installations. Other estimates concentrate on sizable installations. For closed-circuit television varies widely—from a simple, inexpensive unit linking camera and receiver in a single classroom and used primarily for purposes of magnification, to an installation designed for a single school building, to operations linking all or nearly all the schools in a state (as in South Carolina) or county (as in Washington County, Maryland). Furthermore, estimates are outdated as soon as they are made, so rapid is the spread of closed-circuit television.

There are probably close to 1,000 closed-circuit installations serving educational purposes, including 275 systems that are substantial in scope and size. Surveys indicate that slightly over half the educational systems are in colleges and universities, about one-fourth in the lower schools, and the rest in medical institutions and military installations.

Until recently there was undue competition, vigorously fanned by the equipment and utility companies, between the proponents of broadcast television and those of closed-circuit television. Happily, this has abated somewhat (if high-pressure selling has not), as experience has demonstrated the complementary virtues of the two modes. There is a case to be made for the virtues of educational broadcasting despite scheduling and other difficulties. ETV spokesmen point out the potential for higher instructional and production quality in an operation that can draw on the pooled talents and resources of a larger area. Moreover, broadcasting can provide a breath of fresh air for the sometimes hermetic world of professional education.

An important consideration that affects the choice of closed circuit or broadcast is obviously the cost. The cheapest and easiest way for a school system to get instructional television is to take advantage of a broadcasting setup already in operation by joining a school compact and paying the prorated assessment for televised lessons received. But any generalization beyond this when comparing relative costs is still extremely risky. Capital costs for most ETV stations run from $400,000 to $500,000. And a recent survey of forty-seven ETV stations showed that operating budgets for in-school television range from $1,000 to $650,000. The median was $142,000. Investment in closed-circuit installations and their operation reflect an even wider range.

There is no easy formula whereby a school or college can determine the most economical way of inaugurating televised instruction. Numerous factors must be considered, including politics, geography, manpower, size of the school system or institution, and local circumstances such as whether a nearby manufacturer may offer a special price on equipment. Above all, the cost depends on the educational purposes television is to

serve: How many subjects are to be covered? How many classrooms? Is simultaneous transmission of two or more lessons important? Is education of the public part of the objective?

Comparative cost accounting is one of numerous large gaps in the current knowledge about ETV. Recently, there have been important findings in this area, notably the study of ETV station finances completed in mid-1965 by Frederick Breitenfeld Jr. of the National Association of Educational Broadcasters. The North Central Association of Colleges and Secondary Schools, with Office of Education support, is publishing a pilot study by L. E. Hull of Indiana University that provides a model to help potential users determine the relative costs of instructional television, however distributed. NCA may undertake a feasibility study to test the model.

A new and economical dimension was added to educational television in 1963 when the FCC instituted what is formally known as the Instructional Television Fixed Service, and more casually as the 2,500-megacycle system. It is a low-power service for education that makes possible multichannel television outside the conventional broadcast band. This development—still so new that only a handful of institutions have tried it out—is, in effect, a contradiction in terms: a *closed* broadcasting system. Programs are sent out over the air, but can be received only on equipment especially designed to receive them.

These, then, are the basic elements that formed the structure of instructional television in 1966: over 100 ETV stations, most of them broadcasting in-school programs by day; a dwindling number of commercial channels contributing or selling daytime hours for school programs; hundreds of closed-circuit systems in schools and colleges, many of them transmitting full programs of courses, in some cases to multiple institutions linked together by cable or microwave.

Sharing and its Benefits

There are a number of other important elements in the physical and organizational setup of instructional television. One is net-

working and interconnection. Today such enterprises, long dormant, are showing sharp and substantial growth. Regional and state networks are becoming relatively common. Forty-four ETV stations are already linked in several small groups, and NET has mounted an effort to bring together some of these aggregates. The Eastern Educational Network has fourteen affiliates, stretching from Maine to Washington, D. C., and west as far as West Virginia. Eight of them are in actual electronic contact, and the others have become part of the network by sharing common tapes via the mail. Alabama covers its entire state with ETV signals, and for a long time had the only completely interconnected state network. Educational telecasters give station interconnection across the country a high priority among needed technical improvements.

Another important and lucrative development is the "exchange" of programs among individual stations and institutions. A good deal of this exchange, still by no means general practice, was initiated by the stations themselves or by enterprising school ETV combines like Boston's "21 Inch Classroom." During the school year 1965-1966, for example, San Francisco's KQED, by leasing its programs to stations in states as far away as Florida, West Virginia, and New York, and to the Canadian Broadcasting Company, netted about $40,000 or 15 per cent of its in-school operating budget.

A more formal setup for exchange is the instructional television library, which took many years to develop. Three libraries of sorts were established in 1962, and supported as demonstration projects by the U. S. Office of Education. The only one of the three that was originally designed to be national in scope —the National Instructional Television Library (NITL)—engaged in very little program exchange, but concentrated rather on assessing available programs and program sources, and on determining ways to improve them. The Northeastern Regional Instructional Library sent out kits of sample lessons in its first two years, and continues to distribute programs to a limited extent, but its main interest is cooperative production and the encouragement of local production to meet regional needs. Only the Great Plains Regional Instructional Television

Library in Lincoln, Nebraska, has devoted its resources to the exchange of tapes, on a scale well beyond its original mandate.

The future of the three libraries became highly uncertain in 1965 when the original Office of Education grant ran out. NITL was detached from New York and its earlier NET connection. Revised and expanded, it now forms the nucleus of the National Center for School and College Television in Bloomington, Indiana, which is under the auspices of the Indiana University Foundation. The Northeastern library hopes to pursue its current interest. When the present Office of Education grant terminates, the Eastern Educational Network plans to incorporate the library's distribution of school programs with its own distribution of cultural programs. The Great Plains library, after working out an accommodation of roles and purposes with the Indiana center, plans to build on its initial success and to continue its operation, with or without subsidy. In its first year, Great Plains distributed a single series—twice. By the school year 1964-1965, the figure was up to thirty series, distributed more than sixty times. The following year, Great Plains was distributing more than 140 series, and supervising the production of a series of programs on ITV utilization by ten studios in eight states. Paul H. Schupbach, director of the Great Plains library, confidently expects the library to achieve economic independence.

In addition to the library of regional or national scope, a small but significant trend is apparent in the creation of state libraries of tapes and films. Pennsylvania and New York, for instance, have accumulated sizable inventories of televised courses and programs.

The growth of program exchange is helping instructional television to outgrow the extreme localism that marked its beginnings. Another contributing factor is the increasing number of school compacts, whereby school systems band together to share the cost and educational responsibility for in-school broadcasts. Several of these compacts have already been mentioned—"21 Inch Classroom," in Boston, for instance, and Chicago's CAST. Their acronymic counterparts are in operation throughout the country: RETAC in Los Angeles County,

BRITE in the San Franicsco Bay Area, GRETA in Houston, and many others. Additional compacts are springing up constantly. In New York State alone, there are eight cooperative ETV councils at work. The Rochester Area Educational Television Association (RAETA), for example, operates a videotape production center and, pending activation of its own UHF station, broadcasts over commercial stations in Rochester. Thirty school districts, plus parochial and private schools, are paying members of RAETA, using two to two and a half hours of programing each week.

The compact brings together into a committee representatives, often curriculum specialists, of all the districts supporting the in-school television broadcast over the local ETV (or occasionally, commercial) station, and acts as the link between the station and member schools. The committee may have a small staff of its own which often consists of a single overworked individual. The committee's representative works with the station staffer charged with in-school operations and with the studio teachers.

In general, it is the school people, working through subcommittees and questionnaires to determine curriculum needs and the response to current television fare, who are responsible for the educational content of the programs. Actual production is delegated to station professionals, ideally working closely with the studio teacher who is, in effect, both star and producer. Closed-circuit systems of any substantial size also work through school committees—perhaps TV coordinators in each school—but here, for obvious reasons, the setup is more hierarchical, since the television operation is confined to in-school programing and is directly controlled by the schools.

ITV's encouragement of these school compacts and councils may constitute in itself a major contribution to American education. Real interschool cooperation is something new for the public school system. Many a school, pushed into some kind of working relationship with neighboring schools by the imperatives of television, has discovered the advantages of such collaborative effort and extended it to other fields.

In higher education, too, the need for cooperation has long

been evident. As C. R. Carpenter once observed: "High-quality [TV] courses cannot be developed and justified economically and educationally by and for use in only one university." But few of the inter-institutional collaborations in television have produced outstanding results. However, there are hopeful new ventures. In New York City, for instance, during the spring semester of 1966, the Council of Higher Educational Institutions broadcast over the municipal station (WNYC-TV) courses in electrical engineering, in the humanities, and in general psychology, which were produced, respectively, by Purdue University and the universities of Florida and Texas. Institutions have used these broadcasts in various ways: as on-campus credit courses, for student enrichment, and for evaluation by faculty members. The council will continue the humanities and psychology courses; starting in the fall of 1966, it will add a course in the history of Latin America, produced by the State University of New York.

The Production Process

Production of in-school programs today is far more skilled and sophisticated than it was at the outset. Experience, if nothing else, has helped to improve the product. The often awkward teaming up of educator and communication specialist has improved somewhat, generating a degree of mutual enlightenment. On the whole, more time, better talent, and a little more money are available.

ITV production belongs to an order of activity quite remote from that of commercial TV production. A network series, such as "Bewitched," costs on the average $66,000 per half-hour program to produce. In 1964-65 the median cost for producing a half-hour in-school program was $150 to $200. The range in recent years has been between a low of $50 and a high of $2,500 (for such heavily subsidized programs as those of MPATI, for instance).

It is a rare ITV series (comprising thirty programs or so) that is budgeted for as much as $30,000. There are exceptions. San Francisco's KQED which used to budget around $10,000

for a series, may spend as much as $75,000 today. It recently budgeted this amount for a new math series, including over $25,000 for filming on location. In part because of the prevailing small budgets, in-school programs have made limited use of expensive location footage or even film clips. Television's power to bring the great globe itself into the classroom all too often shrinks in practice to the electronic reproduction of the classroom in the classroom.

The conditions of production reflect the great variety to be found in America's ETV structure, whether one considers broadcast or closed-circuit programing. Of the hundreds of closed-circuit installations, the majority operate without benefit of studios: they originate programs or demonstrations live, right in the classroom. On the other hand, big closed-circuit operations boast well-equipped studios and adequate professional staffs, including designers and graphics departments. South Carolina's ETV center, for instance, has remodeled a former supermarket on the outskirts of Columbia into what the center considers "the best ETV facility anywhere," with three studios, the most up-to-date professional equipment, and a staff of more than a dozen graphics specialists, including a full-time animator.

The range of ETV facilities is indicated, at one extreme, by KOAP's tiny studio on a steep hillside overlooking Portland, Oregon, and at the other by WGBH's glassy new headquarters overlooking the playing fields of Harvard. Somewhere in between are WQED's Monongahela-Gothic quarters in Pittsburgh, most ingeniously converted to electronic purposes from what was originally a luxurious Presbyterian manse.

At first, all in-school programs were produced live, with scant rehearsal time and barely more time for preparation by the studio teacher. The schools and colleges that pioneered televised instruction usually went on the air with a pressing sense of urgency. They seemed obsessed by sheer quantity and the conviction that it was essential to keep the lessons coming, no matter how they had to skimp on solid preparation and finesse. Throughout the country, from Hagerstown to Houston, from Columbia to Seattle, old-timers recount similarly harrowing

tales. When Los Angeles County, for example, first began to put out programs for a small group of school districts on a commercial station in 1958, it used volunteer teachers who were allowed just an hour and a half per program, including air time, for planning, rehearsal—everything.

All ETV stations and the large closed-circuit installations are now equipped with videotape recorders, though often with only one, which excludes simultaneous recording and transmission. Most school programs are still locally produced and, as late as 1964, a survey showed that more than half of this local production was broadcast live or recorded on tape that was erased almost immediately. Denver's KRMA, for instance, and Chicago's TV College broadcast lessons live, taping them simultaneously for later repeats. Some places tape them only for evaluation or for some other special purpose.

Great variety also marks the scheduling of production in ITV. Some operations concentrate production in the summer months so as to have new series completed when the school year begins. Others space production throughout the year. As noted earlier, "21 Inch Classroom" airs a new series with only a few lessons completed to give the production staff the benefit of feedback from the classroom before putting together the remaining programs. Most operations provide for some regular revision of series, the redoing of individual lessons or parts of lessons. Revision may be due to the need to update material, criticism from the customers, or self-criticism by studio teacher or staff. There comes a time, too, when a given series must be retired or completely revised. This may be when a series has served its purpose — e.g., when the classroom teachers have caught up with a new math series; when excessive updating would be required of a social studies course; when the production is technically flawed; or even when the studio teacher calls a halt out of sheer distaste for her repeated performance.

There are many different working arrangements for studio teachers. By and large they earn more, occasionally much more, than their counterparts in the classroom. Usually the pay differential derives from the extra working time and, in some cases, from the repeated use of taped lessons. Studio teachers

in Anaheim, California, for instance, get standard classroom pay plus 10 percent and an extra month's employment. Washington County's studio teachers gross more than their classroom colleagues because of time spent in summer workshops.

South Carolina at the outset paid its television teachers $7,500 for eleven months' work, at a time when the average classroom salary in the state was $3,800 for a nine-month year, and that of an experienced, highly competent teacher — the kind recruited by the TV project — about $5,000. In addition, the TV teacher got $1,500 for each year his taped lessons were aired. Today base pay for the studio teacher is $8,500. (One extraordinarily industrious South Carolina teacher produced 480 lessons in mathematics in two years, thereby amassing $4,500 in residuals which permitted her to return to the university for a year and to get her master's degree.)

Some systems require studio teachers to teach at least part of the year in the classroom, or to return to it at periodic intervals. All regular studio teachers have had some classroom experience, however brief. Some teachers remain on their school payroll and are released for television work; others are hired outright by the studio. Unlike college professors, who tend to return to their classrooms after a turn at electronic teaching, school teachers are inclined to stick with television once they have had a taste of it. One ITV impresario reports that in six years no teacher employed by his studio has gone back to the classroom.

In general, the studio teacher is charged with other tasks in addition to preparing and presenting televised lessons, in which he, or more likely she, is commonly aided by a director or producer-director, a graphics artist or staff, and sometimes a research assistant and a curriculum expert. The studio teacher is the prime agent of "utilization," which is ITV shorthand for "getting television used effectively in the classroom." Most studio teachers make a regular round of classroom visits, to see themselves as students and other teachers see them, and to work with school staffs. Some of the larger ITV enterprises have special staff people assigned to do such work. The studio teacher is chiefly responsible for putting together the manuals

that usually accompany each television series. Ranging from simple mimeographed sheets to elaborate printed brochures, the manuals present a prospectus of the television series, lesson by lesson, and usually provide lists of reading and related materials and suggestions for preparation and follow-up by the classroom teacher. Los Angeles County, which uses regular classroom teachers to prepare TV lessons in their spare time, pays them, on the average, $125 per lesson, including the preparation of a manual.

How Many Students Use ITV?

The size and composition of ITV's audience are at best an informed estimate. Responsible sources have issued such estimates through the years, often prefaced with disclaimers reflecting the absence of truly reliable figures. Thus one source or another has estimated the ITV audience at a few thousand in the mid-1950's, half a million by 1959, around five million by 1961, about 11 million or more in 1964, and by now perhaps as much as 15 million—or considerably more.

One difficulty with ITV audience statistics is that they are usually compiled or estimated in terms of "enrollment." In ITV jargon this means the sum of "student exposures" to any kind of regular televised instruction. A student who regularly views, say, three series counts as three in the total enrollment figures. A total of "11 million enrollments," the figure a 1963-64 NITL survey arrived at, overstates the number of individual *students* using television by a factor of "X," including an unknown number of duplications. This difficulty is compounded by the use of the words "enrollment" and "students" as though they were interchangeable. Thus for example, a recent Office of Education publication, *The First Work of These Times: A Report to the People in Education*, states that "16,000,000 students are enrolled in educational television courses"—evidently an allusion to the total *enrollment* figure of 15,800,000 for 1963-64 reported by the *Compendium of Televised Education*, issued annually since 1953 by Michigan State University.

The compendium, which is based on returns from question-

naires sent to thousands of school boards, ETV commissions, commercial television stations, and others concerned with television education, raises more questions than its statistics can answer. For example, the latest volume, with figures for 1964-65, shows an astonishing jump in ITV enrollment to 37 million. According to the compendium's editor Lawrence E. McKune, the spurt in enrollments can be accounted for by a "great increase in the use of television at the state level," by a noticeable increase in ETV councils and smaller networks, and by "increased use by schools not previously involved."

The rapid increase in the numbers of ETV stations and interconnections obviously adds millions of viewers yearly to television's in-school audience. The real significance of this growth is another matter, however. Proponents of ITV are less interested in the gross accretion of new users than they are in more intensive application of TV by schools who have long used the medium. An example of such dynamic growth is the record of a sizable and successful project, the Metropolitan School Service of WQED in Pittsburgh, which covers eleven counties in western Pennsylvania plus four in the West Virginia panhandle. WQED has made all kinds of firsts in ETV, and its school audience has grown from twenty classrooms in 1955, to 9,000 in 1962, to 17,000 today with about 600,000 students. This year, incidentally, Rhea Sikes, director of school services, has polled the member school systems for the first time to determine the actual number of students using television, in addition to the usual TV "enrollment" figures. The results show that about 150,000 students (or a quarter of TV "enrollment") are viewing WQED's school programs—a healthy 20 percent of all the students enrolled in member schools.

Another failing in most figures on the ITV audience is that they do not indicate except in the broadest terms the educational levels, frequency and duration of lessons, instructional function of the programing, and so on. Such facts about ITV programing are of greater use and interest to educators than the over-all audience statistics.

Two years ago the NITL survey did answer some of these important questions, and though its statistics may be out-

dated, they are still the best available. The survey analyzed the estimated television enrollment of 11 million as follows: about 7,500,000 in the elementary grades; a little over two million in secondary school; a little over 600,000 in colleges and universities; and one million of undetermined grade level. In relation to actual school enrollment, the figures demonstrate that TV made its educational mark predominantly in the lower grades. The use of ITV in the secondary school was not much higher proportionately than it was in higher education.

As to what was taught, how often, and for how long, the NITL survey produced a number of interesting findings. A large majority of all televised courses in the schools were beamed at the elementary grades, most of them to grades four and six. The closed-circuit systems surveyed placed much more emphasis on basic instruction than did schools using broadcast television. Of the programs distributed by ETV stations, about half could be classified as supplementary to the local school curriculum, about a third as basic instruction, and a sixth as enrichment. The survey showed that most school courses were televised once or twice a week, with elementary-school lessons usually running fifteen or twenty minutes and most secondary-school lessons thirty minutes (most college lessons run thirty or forty-five minutes). In content the NITL survey showed that science and foreign languages outdistanced all other subjects as televised courses. However, virtually every subject has been taught over TV at some time.

Precise up-to-date quantitative information may become available when the new National Center for School and College Television in Indiana, which has absorbed NITL, undertakes to gather facts and figures in addition to its prime production and distribution roles. Precise figures are hardly necessary for an assessment of TV's current position in American education. It is clear that, while television "enrollments" are large and increasing year by year, even a most generous approximation of the audience shows the medium still in a marginal role.

The Impact of Televised Instruction

A tool must be evaluated not against an absolute standard of efficiency but against the efficiency of alternative tools that are available.

HADLEY CANTRIL, *Chairman*
Institute for International Social Research; 1950.

In the 1950's some of the most astute educators in the country believed that television's effect on American education would be profound, that the irresistible force of the explosions in population and in knowledge would propel the education establishment into using television, if only to cope with the problems of quantity.

Professor Charles Siepmann of New York University was one who was convinced of the inevitable success of TV. In his 1958 volume, *TV and Our School Crisis*, he stated that television is "indispensable" to solving the crises of quantity and quality in the schools. In the intervening years, exploding enrollment, the scarcity of good teachers, and the unceasing new demands on curriculum have reinforced the logic of his argument. But logic notwithstanding, TV has not had a profound effect on American education. The course of events has not fulfilled the revolutionary visions of TV's prophets.

Significant Foundation-Supported Projects in ITV

At the beginning, the Ford Foundation's Fund for the Advancement of Education made small grants to various institutions to give television a trial in actual school settings. It soon became clear, however, that such random encouragement was unnecessary: schools and colleges all over the country were dabbling in the new medium. The Fund therefore adopted a more selective policy, and followed it over the course of a decade. This was to encourage and support ITV projects keyed

to a basic purpose, and in so doing to try out, in the greatest possible variety of situations, television's potential applications to education.

■ TELEVISION AS A MEANS TO IMPROVE THE QUALITY OF INSTRUCTION DESPITE THE TEACHER SHORTAGE: A great many projects of various kinds in the public schools were basically designed to demonstrate the feasibility of the so-called Stoddard plan. The plan was devised by the late Alexander J. Stoddard, long-time superintendent of schools from Bronxville to Denver to Los Angeles, and subsequently a consultant to the Fund. It proposed, among other innovations, to use television "as an integral part of the regular instructional program" to help meet teacher and building shortages, and at the same time to improve the quality of education.

Eventually the Foundation-supported experiment, designated the National Program in the Use of Television in the Public Schools, included varied school systems throughout the United States that were essaying the advantages of using television to instruct larger than conventional classes. Common to all these projects was the hypothesis that (*a*) the extra-large TV classes would make it possible to enlarge the impact of the most highly qualified teachers; and (*b*) this mass instruction would provide, as an equally important corollary, time for the classroom teacher to work with smaller-than-average groups or with individuals.

THE RESULTS: The National Program produced ambiguous results. It is noteworthy by its very size, since at its peak it involved more than 200,000 students in almost 800 schools throughout the United States, ranging from a two-teacher high school in Nebraska to schools in Detroit and Philadelphia enrolling thousands. By the same token, the program's scope and variety suggest caution in attempting to generalize its effect, especially since a prime feature of the project was to apply television to a great variety of subjects, grade levels, and school environments. The participating schools were encouraged to pursue different practices as to schedules, space arrangements, choice of student teachers, and many other matters.

Although each school's use of television differed from the others, all the projects in the National Program (except for certain small rural schools) shared one important characteristic: the introduction of the larger-than-average class, up to 175 students in elementary schools, and ranging from 200 to 500 in junior and senior highs.

In general, the results showed that television could be used to teach very large classes, with corresponding savings in teacher time and classroom space, and there was at least tentative confirmation of the hypothesis that television could improve the quality of education with no increase in cost.

In attempting to integrate television into the instructional process, the National Program encountered serious difficulties, particularly in the secondary schools: most classroom teachers resisted the sharing of responsibility with the studio teacher. It became clear, too, that televised mass-teaching was unworkable unless the programs were of high quality. Thus the emphasis of the National Program shifted from the large-class objective to that of achieving quality, and of supplementing and enriching regular classroom instruction. Of the schools that participated in the National Program which are still using television, most use it now in classes of conventional size, and usually to supplement or "enrich" standard classroom fare.

■ TRAINING TEACHERS VIA TELEVISION: In response to America's acute teacher shortage in the 1950's, the states adopted many emergency measures to train teachers quickly, such as retraining housewives long retired from teaching. Television was a logical means to help in training new recruits. Encouraged by Foundation support, Texas became the focus of an early, large-scale experiment to test some of these new measures. Between 1956 and 1959 more than 1,000 college graduates enrolled in a program that tied together every teacher-training institution in the state, the Texas department of education, and eighteen commercial TV stations. Any recruit who enrolled for credit with one of the participating institutions qualified for a temporary teaching permit after successfully completing the one-year televised course.

THE RESULTS: Television is currently used to a limited extent to train teachers (generally for observation and for in-service training). And, of course, in-school TV programs are a prime means of educating the teachers along with their classes. But the statewide Texas experiment, for all its promise, found no followers in other states. And Texas itself dropped the program when the Foundation grant ended. Actual results of the experiment were disappointing: the pool of recruits was smaller than expected, and the per capita cost of training was high.

- AIR-BORNE TRANSMISSION OF ITV: A spectacular variation on the network idea became a reality when, in 1961 with Foundation support, the Midwest Program on Airborne Television Instruction went into operation. Transmitting over two channels from a DC-6 circling four miles above the small town of Montpelier, Indiana, MPATI could be received over a radius of 150 to 200 miles in all directions, reaching parts of six states. MPATI put on a full day's schedule of programs, cooperatively and expensively produced.

  THE RESULTS: Today MPATI's future is uncertain. The long-awaited FCC ruling, finally promulgated in the summer of 1965, denied its request for six channels, continued the organization's experimental status until 1970, and recommended conversion to the still unproved 2,500-megacycle system. MPATI has since applied to the FCC for six 2,500-megacycle channels, though there are serious doubts that airborne transmission will be practical. MPATI has produced a number of excellent instructional series (the tapes, by lease or loan, have reached many more students throughout the country than the airborne facility has ever reached directly). Perhaps its most lasting contribution is its demonstration of the feasibility of school collaboration over a wide region.

- JUNIOR COLLEGE BY TELEVISION: Backed by the Board of Education and the Fund for the Advancement of Education, the Chicago City Junior College, now called the Chicago City College, undertook to determine the feasibility of broadcasting an entire two-year program over television, thus enabling stu-

dents to receive a higher education and earn a degree by regular TV viewing in their own living rooms.

THE RESULTS: The TV College is an outstanding success. This early experiment proved conclusively that a student could pursue a junior-college program exclusively over television. Since 1956, when the Chicago experiment began, there has been an astonishing growth of junior and community colleges throughout the country. States and cities still without these institutions are planning to build them rapidly to provide for the millions of students pouring out of high schools who need further education but lack the ability, motivation, or money to attend a four-year institution. Television's potential use in helping to educate these students, in the face of an acute faculty shortage, is obvious. Chicago's experience has therefore aroused great interest and brought a stream of observers. A number of junior colleges are currently making use of TV, and others have plans to do so. But Chicago's success in bringing education into the house has not been readily transportable, and legal barriers have prevented other junior colleges from using Chicago's taped courses.

■ TV ON THE CAMPUS: An early Fund grant went to Pennsylvania State University, one of the first institutions of higher education to use TV for credit courses on campus. The university was anxious to experiment with the medium in a range of uses, and to make precise evaluations of the results. So over a period of four years the Fund supported elaborate studies in many areas—student response to TV under varying conditions, relative effectiveness of television and direct instruction in different subjects, comparative costs, etc.

THE RESULTS: Penn State continues to make extensive use of television for on-campus instruction, with the project entirely self-supporting since 1960. TV enrollment reached a peak of just over 20,000 in 1962; since then it has leveled off to about 13,000. The decrease is attributable primarily to a university decision to make optional certain previously required courses that had inflated the TV enrollment figures in the early 1960's.

Penn State has taught a wide range of subjects over television, and now offers twenty-eight courses, from family economics to meteorology. It has embarked on a policy of taping a number of carefully planned courses for use on many campuses.

Unfortunately, Penn State's experience and its exhaustive evaluation of ITV's effectiveness, feasibility, and appropriate uses have influenced relatively few colleges and universities to make comparable use of the medium, even in Pennsylvania. By now, to be sure, various big state and municipal universities have enrolled large numbers of underclassmen in televised courses, but in general faculty resistance to television continues strong. Many promising applications of television to higher education—some, as in Texas and Oregon, linking institutions together in cooperative ventures—have ceased or are continuing in low gear. In 1963 a definitive survey of the uses of new media in higher education came to this conclusion, as stated by Professor Lewis B. Mayhew of Stanford University: "With few exceptions, such as at Pennsylvania State University or the Chicago city junior colleges, college teaching seems to go on as always. . . . After the experiments have been completed and reports written, the matter too frequently is dropped or is reinterpreted so as to leave undisturbed the slow waltz of lecturing, testing, and grading which is the conduct of education."

■ NATIONWIDE COLLEGE COURSES VIA TV: Beginning in 1958 with Foundation underwriting, "Continental Classroom" went on the air over more than 150 NBC outlets with a course in atomic age physics, taught by Harvey White of the University of California and broadcast at 6:30 A.M. The special hookup was designed to make the course available to any college in the United States; 300 of them picked it up that first year. Courses in chemistry, mathematics, and American government followed.

THE RESULTS: After several heavily subsidized seasons on the air, racking up an impressive record of participating colleges and active viewers, the "Continental Classroom" programs were dropped. No comparable college course is now being televised nationally.

These then were some of the areas of inquiry to which the Fund and Ford Foundation grants were devoted. Meanwhile other promising ventures got under way with little or no outside support. An outstanding self-starter was South Carolina's statewide system of televised instruction over closed circuit inaugurated in 1960, with connections into fifteen high schools in nine cities, and designed for eventual coverage of every elementary and secondary school in the state.

There were also a number of experiments that were only slightly augmented by Foundation grants. The closed-circuit program for the elementary schools of Anaheim, California, is a good example. After two years of careful study and preparation, Anaheim in 1959 initiated a program of televised lessons for fourth- and fifth-graders, later extending it to the two grades below. James Brier, director of the ITV project, reported that "Anaheim's school board, believing that television could help improve education, convinced the town to start full throttle with financing, studios, and everything." The district committed $300,000 for the first year, and $40,000 each for the next two. The Foundation granted $25,000 the first year, $40,000 the second year, and $29,000 the third year.

What Went Wrong?

Televised instruction in the decade that has passed since its beginnings has demonstrated but not achieved its considerable potential for improving instruction. Many of the schools and colleges that early adopted television are still using it, and there has been a steady accretion of new users. But even in considering sheer volume, it is apparent that something, or a number of things, went wrong with ITV. Much more serious is the scant evidence that many of the schools and colleges that use television have thereby substantially improved the quality of education. It is significant that, by and large, the really innovating schools are doing little with television.

Why has American education been so reluctant to accept this apparently logical solution to many of its problems? And when it *has* adopted ITV, why has it used the medium primarily

for supplemental, optional, or marginal purposes? American education's operating decisions are usually made according to immediate local demands and resources. If excess enrollment threatens, the local educational organization is apt to adopt makeshift measures to meet the crisis. It may put on double sessions or eliminate kindergartens or commandeer a church basement for overflow classes—short-term and regressive measures, to be sure, but they have the advantage of economy and familiarity.

Peter Schrag, journalist and educational administrator, makes the point well in his recent *Voices in the Classroom:*

There is no American school system, only a multitude of different systems, each with its own concerns, its own problems, its own needs and its own internal kind of perfection. Each is affected by a complex interaction of national and local attitudes and pressures, community conditions, university scholarship, and legislative requirements. Many of them are similar, and few may be almost interchangeable, but each of them is in some respect unique. . . .

While the schools are often responsive to national demands and attitudes, and while they are affected by state laws specifying who may or may not teach, by regional accrediting associations, professional organizations, and by legislative curriculum requirements, they are also the creatures of local conditions and local demands. The new programs and ideas, the formulas, the new books are wares in a vast new educational supermarket from which particular schools can make choices, but there is no model school, no model system applicable to all situations.[2]

The heterogeneous American educational "system" helps to explain why the ITV record varies so radically from place to place. What is of importance is not an abstraction called "instructional television," but a boy in a rural school who learns enough chemistry via televised courses to enter pre-medical training at the state college; or a student in a Boston parochial

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[2] Peter Schrag, *Voices in the Classroom: Public Schools and Public Attitudes,* pp. 1-4. Boston: Beacon Press, 1965.

school who takes a vicarious trip to the Vatican over television; or second graders in Indiana, whose teacher never took a college science course, awakening to the delights of botany through a series of lessons broadcast into their classroom; or a housewife in Chicago who takes a full junior-college course without ever leaving her home; or a freshman at the University of Houston who receives most of his basic courses over TV at home and who otherwise might have been denied college because enrollment outran facilities.

Even in these instances, the stress is on quantity. Has television made a substantial contribution toward meeting the needs of education? In the light of the current educational crisis compounded by soaring individual and social demands on the one hand and shortages of staff and facilities on the other, the answer is probably "No." ITV's accomplishment is even more dubious when one considers America's enormous resources, the undisputed potential of the television medium, and the actual resources that have already been poured into it. Jack McBride, an outstanding ETV expert, recently made a sobering observation: "If something happened tomorrow to wipe out all instructional TV," he said, "American schools and colleges would hardly know it was gone. I say this as an ardent, and undiscouraged, believer in the efficacy and importance and ultimate full use of TV in education. But TV is still far from the point of playing an integral role in education. We're still peripheral."

Time itself may vindicate ITV. Enrollment pressures and the attendant shortages that could be ignored when they were merely national statistics or projections will undoubtedly make school and college administrators ready for technological solutions when the statistics come to life in their own institutions.

Ten or fifteen years are a very short time for any innovation, especially in education. Even Marshall McLuhan (who sees electronics rescuing misguided literates from the evils of Gutenberg) views tolerantly the modest accomplishments and obvious drawbacks of instructional television to date as normal growing pains. There is no doubt that television has already contributed substantially to the knowledge and skills, even to the insights and intellectual growth, of countless students from

kindergarteners to medical students—if only as a replacement for a missing, or inadequate, teacher. But such considerations cannot be used to explain away TV's failure to really change educational practice. The need to upgrade instruction is more urgent than ever, and any new tool designed to fill that need must prove its worth quickly.

The Large Television Classes of Dade County

By magnifying and extending mediocrity, television may actually lower instructional quality instead of raising it. The unfinished story of the ITV experiment in Dade County, Florida, which was supported by the Ford Foundation, is a case in point. The Dade County public-school system initiated its television project in 1957 with nine participating schools, broadcasting its programs live from two studios at school-owned Station WTHS in Miami. By 1961, its fourth year of operation, Dade County was satisfied with television's effectiveness in achieving two goals: 1) improving the learning of the county's boys and girls; and 2) helping to mitigate an extreme shortage of teachers. Continued testing showed that Dade County students in the TV classes "were achieving as well or better than non-TV groups." (The county even extended its broadcasts to the island of Bimini, fifty miles away, to augment the instructional resources of Bimini's one-room, one-teacher schoolhouse.)

Dade County persevered in the use of TV to teach large classes, and thereby effected economies. Superintendent Joe Hall reported in 1962:

This current year we have utilized the savings in teaching personnel to pay the full operating cost of the television station and to provide educational services in the form of specialized personnel such as remedial reading teachers, counselors, and additional librarians. To provide for the number of pupils that we now have in our buildings in the established pattern for education without the large television classes, which are employed in a limited number of schools, would require an immediate capital outlay of at least four million dollars.

If our present rate of growth continues, we believe . . . that the amount of capital saving in schoolhouse construction will be increased far beyond this point.

The rate of growth not only continued, it increased. The school system was pressured by shortage of funds, enrollment increases beyond expectations, and many special problems, including politics, staff conflicts, and the influx of Cuban refugees. It therefore relied increasingly on television to compensate for nonexistent classrooms and teachers.

The various pressures bred unfortunate results. Shortage of funds precluded adding essential equipment or replacing what was obsolete. TV programs were ground out in great volume without sufficient preparation or careful choice of studio teachers. The "large television classes" cited by Superintendent Hall were overdone, and were made to carry an excessive instructional load. Run-of-the-mine instruction or worse, once confined to the four walls of the classroom, was broadcast for everyone, including parents, to see. These were among the difficulties that roused public opinion in Dade County against the use of television in the schools and culminated in the formation in 1963 of a Quality Education Committee.

The committee called in three distinguished educators from other parts of the country, who, after a brief study, urgently recommended that the Dade County school system step up its own efforts to appraise the functioning of its TV instruction and that it retain a highly qualified consultant to examine the whole program.

June Dilworth, the director of school broadcasting for the University of Washington's station in Seattle, spent two months evaluating the Dade County program and preparing her report. Her major recommendations stressed the need for continued focus on the instructional program and on television's contribution to learning. She suggested that buildings and equipment be increased and improved, and that "large class groups be reduced to optimum size for quality instructions." Dade County's administrators and staff are now work-

ing to put these recommendations into effect but it is obviously too soon to judge the results.

Dade County, with its dedicated but bedeviled educators, happens to be one highly visible illustration of the mistakes and misfortunes that have plagued the ITV movement. Under pressure, educators have tended to overwork television, to concentrate unduly on its promise of economy, and to by-pass quality. The Dade County experience should be a warning to those who think instructional television's triumph is merely a matter of time, of enough enrollment pressure, or of overcoming the conservatism of educators.

The Question of Quality

"GIGO," a new term used by computer experts, can be applied to ITV. It refers to the fact that if poor information is fed into a computer, poor information is poured out with fantastic speed and in prodigious quantity; if poor programs are fed into a television system, poor programs are available instantaneously on unlimited numbers of television receivers.

GIGO is short for "garbage in, garbage out." Instructional television is too difficult to initiate, too costly to maintain, and has too valuable a potential for education to risk GIGO . . .

EDWIN G. COHEN, *Director*
National Center for School and College Television; 1965.

What is the merit of the televised instruction currently available in the United States? And how well is it used in the nation's classrooms to actually promote learning? The answers to these two questions largely explain ITV's limited influence on our schools and colleges.

On balance, ITV is still deficient in quality. To be sure, programing has been immensely improved since its beginnings. ITV producers have learned a good deal about education and how to apply their professional talents to classroom needs. Teachers and other educators have learned to respect and, in some measure, to exploit the medium itself. There is no question that there are many good courses and even more individual programs of merit.

But it is generally conceded that other countries—Britain, Japan, France, Italy—have outdistanced the United States in the quality of their educational television, including instructional programs. Broadcasting facilities are owned and operated by the government in these countries and most ETV is produced in centers for national or regional distribution.

Many critics, domestic as well as foreign, believe that America's ITV product cannot compete with its counterparts

overseas so long as American production remains local and decentralized. It is hardly fair to apply an absolute standard of values to the American product without regard to the context of the programs. As a sympathetic foreign critic said recently, observing the adverse reaction of a visiting group of educational broadcasters: "I agree the American programs should be better —and they *would* be better if they commanded national resources. But I realize, too, how superior the ITV programs we just reviewed may be to the conventional instruction available in the average little schoolhouse."

In judging a televised series of daily algebra lessons designed to take over the entire task of teaching ninth-graders in rural schools spread wide over the state of South Carolina, it is neither fair nor useful to apply the same criteria by which one judges a once-a-week music appreciation program produced for sixth-graders by WGBH with all of that station's expertise and the musical riches of Boston. Nor to compare the algebra series with the first-rate geography series produced by Denver's KRMA to supplement classroom teaching with an array of outside resources and ingenious studio techniques.

The "talking face" has come in for a considerable amount of blame in the continuing attempts, by insiders and outsiders both, to pinpoint the deficiencies of America's ITV. The attribution is natural, since so much ITV is, in effect, the teacher on camera. The traditional classroom technique has been automatically transferred to the screen. Interestingly enough, some British critics, for all their BBC conditioning, see nothing wrong with the talking face per se; it all depends on what is done with it. And John Schwarzwalder, manager of KTCA-TV, Minneapolis-St. Paul, recently extolled "the mobile, intelligent, infinitely flexible human face as the best audio-visual or 'production' device ever invented, or which ever will be invented." Indeed, the whole matter of production values and their correlation to instructional values and effectiveness is one of the unresolved questions of ITV. Schwarzwalder believes that "production, as such, does not increase learning. Indeed, it is doubtful that it has anything much to do with learning." The

point is provocative and highly arguable. An answering critic suggested that Schwarzwalder was referring to measurable curricular learning, but not to deeper and less measurable kinds. Over-emphasis on production values can lead to mere gimmickry, but on the other hand, sensitive techniques may encourage better classroom use of ITV.

Research Results on Learning through TV

Most of the investigation of television's quality as an instructional medium has been concentrated on measuring objective results. The results of research are overwhelmingly affirmative: students learn through TV. There has been no comprehensive analysis of the evidence since the well-known study in 1962 by Wilbur Schramm, director of Stanford's Institute for Communication Research. At that time Mr. Schramm concluded:

There can no longer be any doubt that students learn efficiently from instructional television. The fact has been demonstrated now in hundreds of schools, by thousands of students, in every part of the United States and in several other countries . . .

Instructional television is at least as effective as ordinary classroom instruction, when the results are measured by the usual final examinations or by standardized tests . . . [*And*] *employing the usual tests that schools use to measure the progress of their students, we can say with considerable confidence that in 65 per cent of a very large number of comparisons between televised and classroom teaching, there is no significant difference. In 21 per cent, students learned significantly* more, *in 14 per cent, they learned significantly* less, *from television.*[3]

Besides this over-all conclusion, which has been cited again and again by TV's proponents in education, Schramm reported certain other positive findings, as well as some that tended to cancel each other out, or at best left particular areas of in-

[3] Wilbur Schramm, "What We Know about Learning from Instructional Television," *Educational Television: The Next Ten Years.* Stanford: Institute for Communication Research, 1962.

quiry in doubt. The studies showed important correlations between subject matter and grade level (for instance, televised instruction in mathematics is more effective in the elementary grades than in high school); they indicated that class size appeared to make little difference in learning via instructional television; and they revealed that students and teachers were most favorably disposed toward television in the lowest grades, becoming less well disposed in high school and college.

Since Mr. Schramm's survey many researchers have produced many papers and monographs on TV in education. A recent listing of doctoral dissertations on television and radio includes more than 200 entries for educational broadcasting, most of them written in the past decade and a half. In 1964, Wilbur Schramm's institute, under a U. S. Office of Education contract, compiled some 350 abstracts of research on instructional television and film, representing a substantial sampling of the work done between 1950 and 1964.

The largest category by far in all these studies deals with comparisons between the effectiveness of televised instruction and that of face-to-face, or conventional, classroom instruction. These studies preponderantly document no "significant differences" in the measured results of the two modes of instruction.

In his introduction to the 1964 compilation, Leslie Greenhill, director of Penn State's television project, criticized the experimental design used in many of the studies. The quality was very uneven, he found, citing a rigorous analysis that found the vast majority of the comparisons of instructional effectiveness "uninterpretable."

Besides the comparative-effectiveness studies, the Stanford compilation includes studies on attitudes toward televised instruction, on the use of TV for such special purposes as demonstration teaching and professional training, on the effects of production variables in instructional programs, and a considerable number of studies on the important question of the value of supplementing televised instruction with various other instructional devices. A doctoral candidate at the University of Minnesota, for instance, found no "significant differences" in the learning achievement of education students making direct

observations of high-school classes, those using films, or those observing classes via television. A study of University of Toronto undergraduates studying anthropology by various instructional media showed that "media do influence retention in terms of immediate and delayed retention tests." The researchers concluded that "the superiority of the TV group over radio and reading reconfirm previous experiments showing that two-sense modality presentations are more effective than one-sense modality presentations."

One of the most interesting and revealing studies is the Denver-Stanford project, completed in 1964 under an Office of Education grant. Broadly designed to test "the kind of teaching and learning context that would make for maximum learning from instructional television," the study concentrated its attention for three years on Denver's use of television for teaching fifth- and sixth-grade Spanish. It kept the experiment within financial bounds, thus making it widely applicable. (The project used tape recorders and record players to some extent, but installed no language laboratories.)

The experiment established, to the satisfaction of the researchers and the school system, that Denver had found an effective context for instructional television in elementary Spanish with two simple combinations:

For the fifth grade — Eclectic practice conducted by the classroom teacher, practice in the classroom with an electronic aid (preferably a dual-channel tape recorder), and parent participation in viewing and practice at home.

For the sixth grade — Eclectic practice conducted by the classroom teacher, programed instruction (as soon as the pupil is ready for it), a Spanish corner in the classroom, and parent participation in viewing and practice at home.

Here are the findings set down in the words of John L. Hayman Jr., co-director of the project.

A second viewing was valuable when the pupils had no additional instruction; when other instruction was provided, the second viewing was less effective. Classroom practice consisting of structure, dialogue, and narrative drills proved most effec-

tive. Electronic aids, especially those with feedback, were most effective, notably when teachers had moderate experience and preparation. Reading and writing should start at least by the beginning of the second year of instruction. Supplemental activities which provided more variety produced more learning.

A well-trained and motivated classroom teacher was the most effective single learning aid. Both the interest and experience of the classroom teacher influenced learning. Where teacher interest was high, pupil performance was directly related to teacher preparation and experience. Where teacher interest was low, pupil performance was inversely related to teacher preparation and experience. If not begun too early, programed instruction was as effective as face-to-face teaching; a combination of programed instruction and face-to-face instruction was still more effective. Children whose parents participated in the program learned more Spanish than those whose parents did not participate. There was a low correlation between amount of practice at home and pupil performance. There was a higher correlation between performance and the number of weeks participation continued.

While careful and imaginative studies such as the Denver-Stanford project have made substantial contributions to the understanding of the uses of TV in education, recent research in ITV does not add much to earlier findings. Nor does it provide the specific information needed to answer such important questions as those listed in 1962 by Mr. Schramm: How can television be best used, and for what? How can televised instruction deal with different levels of ability? How can television be best combined with other experiences to enhance a child's learning of a given subject or idea?

The following case histories of two famous ITV projects suggest how such questions can be answered in practice. One is set in the lower schools and operates by closed circuit, the other makes use of broadcast television for higher education.

Learning via TV in Hagerstown

The closed-circuit system centered in Hagerstown in Washing-

ton County, Maryland, has produced positive evidence of television's value to the learning of students at all grade levels of the public schools. The experiment began in 1956, subsidized by the Electronics Industries Association and the Fund for the Advancement of Education. The project as such ended in 1961, but television had proved itself so valuable that the county has continued and even expanded its use as an integral part of the instructional program. Today the completed system links forty-five schools to the Hagerstown studios, which can send out six lessons simultaneously by cable to more than 800 TV sets throughout the county. Fifty-six courses are now televised. The county's detailed report notes: "Television has been accepted as an important educational resource . . . School staffs feel that instruction has been strengthened, pupil educational opportunity broadened, and achievement improved. All this has been accomplished by regular school personnel with a minimum of outside technical assistance."

Superintendent William Brish and his staff attribute other gains to television: "The use of instructional television has stimulated teachers, supervisors, and administrators to examine more closely the teaching-learning process and to pursue curriculum development with a new interest." For instance, televised courses have been highly effective in training or retraining teachers on the job, and they have encouraged "a new approach to teaching—by teams."

TV has changed and upgraded the county's curriculum patterns. A notable example is science. Before TV, hardly any science was taught in Washington County's elementary schools, and the high schools taught the standard one-year courses in physics, biology, and chemistry. Now television has made possible a science program extending from first grade through high school. Substantial science instruction in the lower grades has laid the groundwork for two-year science sequences in the high schools.

Other curriculum improvements spurred by the use of television make it possible for elementary-school pupils to receive instruction in art, music, and French, and for secondary-school students to study foreign languages and advanced mathe-

matics. The county's experience shows that television is helpful in relieving teacher and classroom shortages, but more than that it has provided instruction in special areas, such as music and art, for which it would have been impossible to find qualified teachers to cover all the schools. Without TV, according to Assistant Superintendent T. Wilson Cahall, the county would have needed thirty-four music teachers. And the county has found that the use of television, at the same time it was improving the educational program, was producing savings that cover TV's annual operating costs. The Washington County report has this to say about the savings:

In terms of duplicating in conventional classrooms what is now offered on television, the county's savings are substantial. Without television, the county would require more than one hundred additional teachers and a budget increase of almost $1,000,000 to duplicate the courses that have been added to the instructional program. This is more than three times the annual operating cost of the television network. For example, without television, it would cost more than $250,000 annually to provide art and music specialists for the elementary schools.

The Washington County project has proved itself in ways that the school people value more highly than an expanded curriculum or reduced costs. The county's careful evaluation of television's effects on learning indicate that, unlike most of the studies showing that pupils learn as well with television as without it, Washington County's pupils "often achieve better —sometimes much better—in television classes than in conventional classrooms." Outstanding results emerged, for instance, in arithmetic instruction and in music and art. In arithmetic the county had long wanted to do something to improve student achievement, which was generally low by national norms. Television proved to be the answer. Beginning in 1956 with intensive experiments in the fifth grade, the county school system found remarkable improvement in nine months: fifth-graders had made almost two years' progress in arithmetic, from five months below grade level to four months above it.

By the spring of 1961, 42 percent of the county's sixth-graders tested two years above grade level. The success of this pilot experiment prompted the introduction of televised arithmetic lessons in grades one through eight, with comparably substantial gains.

Progress in music and art is, of course, harder to measure. But, in general, tests showed that television pupils in the elementary schools performed more successfully than their counterparts in conventional classrooms. And teachers agreed that, in both subjects, pupils receiving the televised lessons improved in both performance and appreciation.

Chicago's TV College

A highly successful experiment is Chicago's TV College. Like the Washington County project, it began with a Ford Foundation subsidy and has continued on its own since the end of the original grant. It is now in its tenth year. Unlike Hagerstown, Chicago's program utilizes broadcast television, renting space and facilities from the community ETV station, WTTW-Channel 11.

TV College, a part of Chicago's free junior-college system, was initiated to bring credit courses leading to a degree to at-home viewers, which is still its primary concern. But the college has expanded into many new areas: teacher training, in cooperation with Chicago Teachers College; direct instruction on campus; teaching gifted high-school students.

It has modified and improved its television procedures in a number of ways, notably in response to the demonstrated need to augment TV lessons with direct student-teacher exchange via scheduled telephone conferences, open meetings, and the use of programed materials for self-checking. College authorities discovered fairly early that the performance of teenage students taking TV courses on campus fell consistently below that of more mature students taking the courses at home. Campus viewers also lost interest rapidly and withdrew in large numbers from the TV classes. Experimenting with various means to overcome this disparity, TV College settled on the successful device of giving campus students of college age and

average ability at least one hour's extra instruction a week to supplement the twice-a-week telecasts, in a class conducted by an experienced teacher who integrated his instruction with the televised lessons and related materials. The results have been excellent: in a year or two, campus TV students matched the at-home viewers, and soon outdistanced the achievement of students taking only conventional classroom work.

The importance of augmenting straight TV instruction with personal interaction and follow-up can be illustrated with the course in mathematics given by Jerome Sachs, dean of Chicago Teachers College North and a top-notch teacher. The first time Sachs' course was televised, only about a quarter of the viewing students persisted to the end of the semester. Then the college ran the course again, augmented by scheduled telephone conferences, personal conferences with Dean Sachs at a central campus, more interim tests. This time the course retained close to 60 percent of its original enrollment.

TV College has always enrolled thousands of noncredit students, in the early years two or three times as many as those enrolled for credit. Noncredit enrollment fluctuates according to the kinds of courses televised in a school year, rising when vocational or cultural subjects of wide appeal are offered. Credit enrollment, which averaged around 5,000 a year during TV College's first four years, jumped to over 10,000 in 1964-65, mainly because of the increased emphasis on teacher training, services for handicapped students, and advanced-placement courses for high school students. Chicago now has about 100 students working toward the Associate in Arts degree via television alone, and close to 1,000 working toward the degree by combining TV with on-campus courses. A common pattern is for students to take one semester's work via television, then to spend three semesters on campus. There are also many students during any semester who do both—take TV courses at home and regular courses on campus.

TV College in the school year 1965-66 presented nine courses during the day, four of them live and five taped reruns from past years. Every lesson was repeated at night, which is when two-thirds of the TV students attend "class." A new wrinkle is

to put all programs on audiotape: students who miss both telecasts can listen to the tape at the campus on the Loop.

Dean Hyman Chausow is proud of the fact that accrediting agencies, professional associations, colleges, and universities accept credit earned at TV College. He is also an enthusiastic exponent of the economy of ITV as demonstrated by the Chicago experience. By TV College's fifth year the unit cost of TV instruction per student, which at the start had been double the cost of conventional instruction, matched on-campus costs. Since then the unit cost of teaching by television has dropped well below the on-campus cost. A TV enrollment of 800 represents the break-even point, with all costs charged off to the students enrolled for credit. The present enrollment more than covers all basic costs, with noncredit students getting a free ride. TV College can now handle additional students with minor additional costs, making possible further service to gifted high school students, the handicapped, and various other special groups.

Dean Chausow is especially proud of TV College's unique ability to bring higher education to students who otherwise might miss it entirely. In its ten years TV College has awarded approximately 120 degrees for work completed entirely via television. "A large proportion, maybe 70 percent, of these students were handicapped in one way or another," Dean Chausow pointed out. "We enroll around 200 every semester. Many of them are prison inmates." He also emphasized the opportunity TV College brings to housebound housewives, recalling that one of the first graduates was a thirty-four-year-old woman with ten children ("she had three of them while taking her TV courses").

The TV College hopes to strike out into new territory in the future, to include such areas as nursing and other professional education, special classes for the Chicago Police Department, and training programs in data processing and electronics. It also plans to focus still more, in the words of its 1964 report, "on television as a catalyst for instructional and curricular development," especially in conjunction with programed learning. The college is seeking to recruit and train college teachers

and production people with fresh new ideas. Most of TV College's production to date has followed the familiar pattern of merely projecting the lecturing professor on the television screen. It is encouraging, therefore, that the 1964 report concludes by stressing the need to explore "the teaching force of the visual and non-verbal dimensions, as opposed to the almost exclusively verbal emphases of conventional instruction."

In summary, the schools of Washington County, Maryland, and the Chicago City College both have proved to their own satisfaction and to the extent permitted by available measures that television has regularly matched and often surpassed the effectiveness of conventional classroom teaching.

Attitudes Toward Instructional TV

People's attitudes toward instructional television, as both Hagerstown and Chicago stress in their evaluations, are crucial to its success. They are also crucial to the question of quality. It appears that the judgment which teachers, students, and school administrators make of ITV's quality is colored by elements other than the product itself.

This was confirmed in 1962 when sociologists Egon Guba and Clinton Snyder studied classroom teachers in areas served by Midwest Airborne to examine their attitudes toward the new medium. By and large, MPATI programs are superior to run-of-the-mine ITV. Yet the sociologists' findings revealed that teachers' hopes for the improvements that MPATI courses would bring to their classrooms went largely unfulfilled. This result seemed to be related to several factors: the teachers generally had no training in the use of TV in the classroom; their roles were little changed by the introduction of televised instruction, since for the most part it was used only once a day; and patterns of use in the classroom tended to be dictated by agents or circumstances beyond the teacher's control. ("We were interrupted by the telelesson," complained one teacher.) From these teachers' descriptions, the effect of television on their classes was no more beneficial than the weekly assembly film of an earlier generation.

The attitudes reported in this study did not seem closely related to the quality of the instructional television programing. "If television is not reaching its full potential in the classroom," the authors concluded, "much of the blame must be placed at the feet of the school administrators who have made but half-hearted efforts to make ITV utilization possible."

The educator bases his policy decisions not just on scientific evidence but also on the opinions of the colleagues he respects. Whether or not he introduces ITV into his school and how well he uses it, are two questions that depend on much more than his evaluation of research results.

It was for this reason that International Research Associates, in the spring of 1965, was commissioned to conduct a survey of attitudes toward televised instruction among teachers, administrators, students, and parents in four representative projects, each of which had received Ford Foundation support: the Washington County (Maryland) school system, the Detroit public schools, the Chicago City College, and the University of Texas. In all but Texas, ITV had been in operation for almost ten years; the Texas system was installed in 1961.

The survey, conducted through personal interviews, revealed certain over-all patterns of response to ITV. Attitudes seemed to be determined by the academic level of the institution, the degree of top-level support that the program received, and the role and degree of involvement of the individuals in the TV program. Specifically, the following conclusions were drawn.

Administrators and teachers at all four places are predominantly in favor of television instruction. The administrators and television teachers were even enthusiastic, the classroom teachers less so, especially at the college and university levels.

Among students, there is a real split in opinion depending upon the academic level of the student. Students in elementary and high schools are largely in favor of television instruction while those in colleges and universities react for the most part unfavorably.

The degree of top administrative support affects the climate of opinion. In some systems top administrators are convinced

of the effectiveness of ITV as an educational tool, are willing to devote resources to it, and have established clear-cut policies regarding its use; in these systems a more favorable climate exists and there is greater cooperation among all groups.

A person's role in the ITV project affects his attitude. Administrators and TV teachers react very favorably, classroom teachers hold favorable attitudes though less favorable than TV teachers, and the feelings of students are mixed. Parents seem undecided.

Favorable attitudes increase with level of involvement in the TV project. Producers of programs and regular studio teachers are more enthusiastic than those not so closely involved, and even among students those with over fifteen hours of TV credit express greater approval of ITV than those with less exposure.

School administrators, TV teachers, and classroom teachers thought that ITV had brought their students better instruction than is found in the average classroom. Specifically, they saw the following advantages: TV teachers are the best available, excellent visual aids are used, special guests and current events enrich student experiences, and courses are better organized and presented so as to be balanced and complete. Moreover, these advantages accrued to all students, rather than just to those who were fortunate enough to be assigned to the best teachers and facilities. Students considered the visual aids to be the best part of ITV, while parents believed that TV offered the best teachers and that visual aids improved the learning process.

On the other hand, classroom teachers and parents generally believed that there were disadvantages for the pupil who gets TV instruction: absence of contact between student and television teacher, and failure to meet the needs of the non-average student. Administrators and TV teachers disagreed. They believed that students did not suffer from the reduced contact with teachers or from the curtailed attention to non-average students. Among students the chief objection to ITV was that they could not ask questions; this reaction pertained to math courses rather than to ITV as a whole.

There seemed to be confusion in the classroom teachers' views on whether TV had freed them to work with individual students, one of the prime advantages of ITV as envisioned by many of its advocates. Only two out of five responded affirmatively when asked whether TV had increased the time available for "productive teaching." Moreover, when asked specifically about two areas usually considered central to productive teaching—attention to the highly able and to the below-average students—only one-fifth of the teachers felt they had more time for the former and only 7 percent found more time for the latter; roughly half saw no change in the time available; and substantial proportions felt that TV gave them less time for the non-average student.

At Chicago City College and the University of Texas, attitudes toward TV seemed to break down as follows: administrators who were directly involved in the development and operation, highly favorable; other administrators, favorable; TV teachers, favorable; classroom teachers, unfavorable; students, unfavorable (particularly the on-campus students).

The respondents at these institutions of higher learning generally agreed that ITV benefits college students for much the same reasons cited by the respondents at the schools in Washington County and Detroit. Professors who teach on TV believed that its high quality and extension of educational opportunity outweighed any loss of personal contact. Professors in the classroom believed exactly the reverse: they considered the lack of pupil-teacher relationship as negating all benefits.

College teachers, as a matter of fact, were more averse to ITV than any other professional group—and college students had the most negative attitude of all groups surveyed, disliking most of all the lack of contact with the teacher.

Quality in National Perspective

Harold Wigren, who is educational television consultant to the National Education Association, probably sees more classroom television than any one else in the country. He combines an audio-visual background with an undaunted belief in tele-

vised instruction, despite his reservations about most current production. He finds encouraging signs in Boston, in Seattle, in Los Angeles, in Portland (Oregon), and elsewhere, where devoted and perceptive practitioners are trying to harness the medium's highest potential to the revolutionary ideas now current in American education. But by and large, he finds mediocrity. "ITV is on a plateau," he observed. "Most of the big city schools that once tried to use television to accomplish new purposes with large groups have gone back to their conventional ways. Entirely too many teachers regard TV not as a valuable resource to help their students, but as peripheral."

Wigren's disappointment is compounded because he sees a real revolution taking place in school curriculum and methods. "The emphasis on the structure of history and mathematics and physics, the use of methods of inquiry and discovery as against exposition by the teacher, new approaches to fostering creativity and many-sided human talents beyond sheer academic prowess are transforming American classrooms," he pointed out. "ITV needs to exemplify the same creativeness and imagination."

Another quite different, but equally disturbing, testimony to the current mediocrity of ITV was the survey made in 1963-64 by the National Instructional Television Library. One purpose of the survey was to determine the number and the value of TV instructional series available for general use. It confined itself, therefore, to series that were committed to tape or film. NITL evaluated some 150 elementary-school series as to technical quality, accuracy and adequacy of content, and instructional effectiveness.[4]

The conclusions were startling. NITL considered only 9.2 percent of the series fit for distribution; 20 percent were considered almost acceptable. They ruled out a full 70 percent of all the available courses as unsuitable—most of them on the ground of instructional ineffectiveness. As the study reported,

[4] Although most available high-school and college series were evaluated as well, NITL confined its intensive evaluation to the elementary-school series because they reflected "the central position of the elementary school service in the current activities of instructional television."

it was difficult to assess this crucial quality, since "no ready-made instruments were available," but the library worked out what it felt were acceptable techniques and criteria, using panels of trained raters to predict subjectively what the learner response would be to the television lessons. Besides the survey's findings of technical shortcomings and content inadequacy, the major conclusion was that most lessons were instructionally ineffective. The survey reported in this connection:

The conditions under which local series are generally produced do not seem to provide the preparation and rehearsal time, the graphic and studio support that result in exceptional series. Too often, television teachers communicated poorly. They appeared more concerned with the material being presented than its effect upon learners. The content of many lessons was "clear only if known."

The NITL investigators discovered that most practitioners felt they had insufficient information about instructional effectiveness. "The whole costly, complex process of producing and transmitting programs is pointless unless it results in the stimulation of learning," they observed. "Except for isolated and exceptional research activities, scarcely anything is known about the particular instructional results achieved by television series received by millions of American school children." The NITL study attributed the indifferent educational quality of most televised instruction to these three causes:

1. Excessive concentration on local production for local use. This practice not only encourages local references (making the programs unsuitable for use elsewhere) but, more important, limits the instructional effect of the programs. Local production restricts the resources available for research, planning, and consultants. It puts a premium on sheer output and speed and an undue strain on time and talent of local staffs. As the study pointed out: "The key to quality series is the combining of able people with adequate time for planning and testing, supported by strong production."
2. Based as it is on insufficient research and planning, most ITV lacks focus and specific instructional aim. As a result, even ef-

fective programs tend to be inefficient. Too little time has been given to analyzing objectives. Any twenty-second commercial, on the other hand, is the outcome of exhaustive analysis of exact aims and the appropriate means to achieve them. All but the most exceptional televised instruction lacks such pinpointed focus. From this failure follows quite inevitably the common practice of using television simply to reproduce standard classroom techniques and presentation. If television is to improve education and advance learning, every program and series must be designed with precise instructional ends in view.

3. Inadequate understanding and exploitation of television's distinctive characteristics and potential contribute to ITV's ineffectiveness. To be sure, television used as a mere vehicle of transmission neutrally transmits good teaching or bad. As an instructional tool, however, it has unique characteristics, inherent in the medium, that have as yet been scarcely tapped for education.

Utilization of ITV in the Classroom

ITV is only as good as the use to which it is put by the classroom teacher. Lucille Miller, principal of an elementary school in Washington County, Maryland, observed: "The highest-quality televised lesson in the world, if misused in the classroom, is worse than nothing." Gene Nichols in Boston believes that scarcely one classroom teacher in a hundred understands television and knows how to use it.

The NITL survey identified classroom utilization of television as the other significant area besides instructional effectiveness where comprehensive and reliable information is wanting. A 1963 North Central Association conclave of ITV leaders had already agreed that effective classroom utilization was a major need to be met if television was to make a significant contribution to the educational process. In ITV projects all over the country there is serious concern about how to capture the interest and cooperation of the classroom teacher and her superiors. One Michigan producer reported: "You can transmit

ITV to your heart's content all school day long, but if the school principal is indifferent, or the classroom teacher hostile or bored or ignorant of how best to use television, you might just as well address your program—regardless of its merit—to the monitor in your own studio."

Despite the proliferation of teachers' guides, manuals, and workshops, of questionnaires and other feedback devices, it is the consensus of ITV people that not nearly enough has been done to integrate television into the classroom, either into the average teacher's day-to-day program or, in combination with other instructional aids, into the total curriculum and educational purpose of the school or college.

For ITV to succeed it must have the allegiance and cooperation not only of superintendents, principals, and department heads but also, and most important, of classroom teachers and professors. As Lee Franks of the Georgia ETV project said: "Your typical classroom teacher cares much more about what her principal says and wants than she cares about what signal she gets from WXXX." This also bears out one of the findings of the IRA survey mentioned above: that administrative attitudes toward ITV greatly affect the staff's attitude.

TV's record to date in improving education might have been better if greater attention and resources had gone, first, into programing that incorporated new ideas in curriculum and methods, and then into preparing the ground for actual classroom use. Television's failure on these two counts is related to another basic problem: the critical shortage of manpower to get the job done right. By and large, ITV has been in the hands of educators concerned primarily with subject matter and of communication specialists concerned primarily with the production quality of ITV programs. Rare is the practitioner who, by some combination of training or experience or natural talent, really functions as an educational communicator. The supply may increase, as time and the colleges nurture more of these specialists.

ITV at the Crossroads

We're at the crossroads. We've got the hardware. There's more government money available than ever before, and more is promised. We have the chance to do more real educational good in the next five years than in the past fifteen.

LESTER W. NELSON, *Acting Director*
National Project for Improvement
of Televised Instruction (NAEB); 1966.

In recent years ITV has received sizable assistance from both federal and state governments. Washington began to take up the financial slack about the time that private support was tapering off. The first indication of federal interest in educational television came with the National Defense Education Act of 1958, which has been amended and extended in succeeding years. NDEA funds have made close to $30 million available for research and demonstration projects designed to find effective ways of adapting television and other communication devices to education.

The Educational Facilities Act of 1962 authorized matching federal grants to the states, up to a maximum of $1 million, for constructing and improving ETV stations. There is hope that new legislation will expand the scope of the present act by raising states' ceilings and providing for more latitude in ways in which funds can be spent.

Generally speaking, the federal government has shied away from direct support of ETV or ITV production — the area where funds are most needed. There are various explanations for this reluctance (the theory of one Pennsylvania ITV practitioner is that "Washington is just somehow allergic to television"). The parochialism that has hobbled ITV's growth has been noted before; and it was not surprising that Congress reflected the insistence of most schools and colleges on local production for local use. Even more to the point is the American distaste for anything that smacks of centralized control or direction of educational content.

However, there are now strong indications of forthcoming federal assistance for the programing of televised instruction. Earlier efforts in this area might have been premature, since it has taken ten to a dozen years to amass the requisite hardware and create a climate favorable to sharing production, regionally or nationally.

There are also new sources of federal support for ETV and ITV which were still not fully spelled out by 1966. One source is implicit in the various anti-poverty measures, where television might well be a prime vehicle for the war on illiteracy, disease, and the handicaps of slum children. Another new prospect for federal ITV support appeared in the Higher Education Act and the Elementary and Secondary Education Act of 1965. Title III of the latter appropriated $100 million for supplementary educational centers and services, which are designed "to enrich the programs of local elementary and secondary schools and to offer a diverse range of educational experience to children of varying talents and needs." An Office of Education official with many years of service has observed that "no piece of legislation has ever caught the imagination of educators like Title III." With such unprecedented funds available for financing innovation, there is the prospect that public schools will form consortiums to try out all kinds of educational ideas and arrangements never before attempted, including ITV. One section of Title III specifically authorizes funds for "developing, producing, and transmitting radio and television programs for classroom and other educational use." All together it has been estimated that various sections of the act provide up to $400 million for educational television and radio. The Higher Education Act provides less generously for TV, authorizing $2,500,000 in 1966 and an annual $10 million in the two succeeding years for the purchase or repair of television equipment.

Nothing much has yet come of the possibilities for television in the anti-poverty program: no TV-based proposal submitted to the Office of Economic Opportunity has resulted in a grant. But a number of promising grants have been made under various titles of the Elementary and Secondary Act: for example,

a project in Red Cloud, Nebraska, will make use of television in special programs for underprivileged children; another in Casstown, Ohio, will use television to help students in selected subjects such as math and reading; a planning grant to Hagerstown, Maryland, will be used for the creation and evaluation of "exemplary television lessons"; and another to Chautauqua County, New York, is for the study, among other things, of the use of FM radio and ETV to improve instruction.

Actions by the States

The states have responded to federal legislation by actions of their own. The majority of them have appointed ETV authorities of one kind or another, in some cases by naming independent new bodies, in others by investing existing bodies, such as the state department of education, with new responsibilities. Most activity at the state level has been directed at television hardware, with emphasis on interconnections. However, Pennsylvania, Massachusetts, and several southern states have for some time taken an active role in the production of ITV (as in the examples noted earlier), and by 1966 other states were beginning to appropriate money to help local school systems with actual production of instructional programs. Texas and California, for example, both passed bills in 1965 to provide matching funds to school districts for the purchase of instructional television services from ETV stations.

California presents a sidelight on the changing attitudes toward the use of television in education. No California school can proceed with innovation unless the state education code specifically provides for it. When the audio-visual section was added in 1947, the sponsors deliberately omitted television. It took six years and three sessions of the legislature to get through a bill permitting in-school use of television.

By the end of the 1965-66 school year, ETV activities in many states had reached a new high. In some states educational television was still at a rudimentary stage of development, but it was the rare state that had no ITV and no plans for it. An encouraging number had legislation passed or pending

to expand ETV and, in many instances, to build statewide networks. Activity continues especially enthusiastic in the South, which had seized on television early as a powerful tool for upgrading the region's low educational standards and reaching its large number of illiterates. Alabama, North Carolina, and South Carolina are expanding their already extensive ETV coverage. Georgia's projected ten-station network had four stations interconnected by September, 1965, with five more scheduled for interconnection by this fall.

The South's most spectacular plans are the ones that Mississippi has in the works. Until very recently ETV was virtually nonexistent in the state, with a plan devised some years ago apparently shelved. Now, as part of an ambitious campaign to boost the state's economy and to bring in industry, Mississippi is creating in Jackson an elaborate research-and-development complex that includes an ETV center. An ETV specialist formerly with the U.S. Office of Education is charged with developing detailed plans for a statewide color ETV network. Mississippi hopes to get the first station on the air by 1968.

States in other parts of the country are also making significant progress. In Maine a full-scale statewide ETV network went into operation in the fall of 1965, combining a variety of organizational arrangements, with one station owned by a combine of private colleges and three others by the state university. In New York State, under a ten-year development program announced by Governor Rockefeller in 1964, the State University of New York will operate a statewide ETV network. In its first phase, beginning in the fall of 1967, the network will link by two-way microwave the state's five independent ETV stations and also the libraries of the university's three medical schools. Eventually, a two-way interconnection will make the programing resources of SUNY's four university centers available to the other fifty-odd units of the university as well as to the public at large. Delaware, in September, 1965, inaugurated its closed-circuit network linking all 163 public schools in the state, as well as the University of Delaware and Delaware State College, with a production center in Dover. Other states have

extensive plans ready and reasonable expectations of getting the funds needed to put them into effect soon.

Promising ventures into interstate combines for educational television are also in operation. ETV stations in six North Central states (North and South Dakota, Minnesota, Nebraska, Iowa, and Wisconsin) have formed Midwestern Educational Television, Inc., with the goal of developing an interconnected network. In the far West, the Western Interstate Commission for Higher Education is working to expand educational opportunities throughout the region with the use of television. The Committee on Institutional Cooperation, which takes in eleven Midwestern universities, hopes to take an active part in instructional television, including the pooling and exchange of videotapes.

Technological Advances

Meanwhile the number of ETV stations continues to grow, with an estimated 120 stations expected to be in operation by the end of 1966. From that point on, projected activation of stations rises sharply, with one careful estimate predicting some 450 educational channels by 1974 and others predicting at least 200 channels by 1970.

This extraordinary growth stems from the FCC's new allocation table and rulings, and from technological developments. Of the 115 ETV stations now on the air, about two-thirds are in the very high frequency (VHF) band. Most of the new channels will of necessity be ultra high frequency; the severely limited VHF spectrum cannot be expanded. UHF channels have become more practicable as FCC action has made them more competitive with VHF, and federal legislation has made it mandatory for all TV sets manufactured after April 30, 1964, to be equipped to receive UHF as well as VHF. Experience has demonstrated that proper siting can make a UHF signal just as effective as VHF, or even more so.

The increase and improvement in broadcasting facilities are more than matched by developments in closed-circuit television. Responsible projections of the use of closed-circuit TV in

education are just as optimistic as those for broadcast ETV. By 1966 hundreds of schools and colleges were either installing systems or planning installations for two or three years hence. The number of systems is expected to double by 1970. While more than half of the country's educational CCTV systems are in colleges and universities today, a growing proportion of the new installations will be in the schools.

Two technological advances have tremendous significance for televised instruction. One has to do with the recording of programs at the source or reception center; the other with the transmission of programs over large distances.

The first stems from the efforts to bring down the cost of videotape recorders. The professional recorder required for broadcasting costs from $50,000 to $70,000. In 1959 and 1960 the Ford Foundation granted $4,600,000 to nearly seventy ETV stations for the purchase of such machines.

For most of the closed-circuit installations, prices in this range were prohibitive. The fierce competition of manufacturers to get a cheaper machine on the market to meet CCTV needs produced a spate of premature announcements and claims, and thus created an obstacle to ITV's full development: educators and others responsible for budget decisions understandably hesitated to buy equipment in such a fast-changing field. By 1960 a practical VTR was available in the medium-price range, around $10,000 to $15,000. For the most part, the picture quality of these unstandardized machines and their incompatibility with the expensive professional machines made them unsuitable for station use or for closed-circuit work demanding the highest technical quality. But these video tape recorders found an immediate market in closed-circuit installations for general use.

The introduction of a medium-priced VTR meant that Pennsylvania State University, for example, could put its experience with instructional television to greatly expanded use beyond the University Park campus itself. The university has acquired six medium-priced videotape units, and, as mentioned before, is taping courses for use on other campuses; it also plans to use the recorder for teacher training and faculty self-evaluation.

The latest chapter in the VTR story is the advent of even cheaper machines. There are some now on the market that sell for between $3,000 and $5,000. The models selling for around $1,000 are not considered up to professional standards and will probably be limited to home use. The relatively inexpensive videotape recorders have opened up a whole new vista for instructional television, if not for the urgent improvement of program quality, at least for the more effective utilization of television in the classroom and its adaptation to the needs of particular classrooms and individual students.

If a school system or college can acquire a VTR, it could mean, among other advantages, institutional freedom from the straitjacket of the single-channel broadcast day. A major drawback to effective use of television in the secondary schools has been scheduling: big high schools, with multiple sections in every class, get limited utility from a televised program in history or biology broadcast once or, at best, with a single repeat. With VTR, an institution or school can tape all the available ITV programs off the air, to be played back over its own closed-circuit facility whenever it needs them.

The other technical development of immediate educational importance is the still unproved Instructional Television Fixed Service, or 2,500-megacycle system, established by the FCC in 1963. The commission regards it not as a substitute for broadcast ETV but as "an additional means for expanding and deepening education." This new service, using channels from 2,500 through 2,690 megacycles, is reserved for educational purposes. The signal is broadcast through the air, but since it requires special, if moderately priced, receiving equipment, it will probably be utilized only by institutions. Besides economy, its principal attraction to any licensee is the availability of five channels. Programed simultaneously, these channels can bring five different televised lessons to a school or school system at the same time.

ITFS is especially useful in concentrated school systems or in a cluster of nearby institutions. Today 2500 mc systems are operating in twelve locations. All together, the FCC has granted fifty-eight construction permits so far. Particularly

interested in 2500 mc are big-city parochial school systems, which have always been among the most avid consumers of TV instruction. Among the dioceses with projects under way are Baltimore, Detroit, New York, Los Angeles, Miami, Cleveland, and Washington, D.C. The Brooklyn diocese, covering two large boroughs of New York City, includes 6,000 teachers and 240,000 children in 240 schools. It will spend about $1,250,000 for its ITFS system. But as the Reverend Michael Dempsey, Brooklyn's ETV coordinator, has pointed out: "This amount would buy only half an elementary school, only one-fifth of a high school. For what we expect to accomplish, it's really 'non-money' as educational outlays run today. The $1,250,000 represents our total capital investment, remember. And compare it to what we'd have had to invest in a standard closed-circuit system connecting all the schools of the diocese—why, we'd spend more than that just to operate it for a year!"

The Brooklyn diocese had made some use of the instructional programs broadcast over WNDT, the community ETV station in New York. But the diocesan schools had urgent needs that couldn't be satisfied by programs designed to appeal to many school systems over a single channel. Father Dempsey and his associates are counting on TV to help solve one of the most pressing diocesan problems, teacher training — for example, upgrading elementary teachers and giving them competence in mathematics and science. They see in 2500 mc "the opportunity to make the parochial schools of Brooklyn really first-rate." The Brooklyn system, which eventually will command four channels, went on the air in April, 1966, with two channels, following months of careful preparation of programs and school staff. "It's immaterial," says Father Dempsey, "how excellent the design of your ITV project is and how fine your programs. It's no go if you don't have your principals and teachers *wanting* TV."

Some critics think that the FCC overestimates ITFS as the solution for major ITV problems. But if it proves out, it can go far to solve the problems posed by the rigid natural limits of the television spectrum. And there are other transmission developments that promise to make important contributions,

such as a more sophisticated use of translators, the proposed low-power community UHF stations, and the extraordinary growth of community antenna television. CATV is a phenomenon of private enterprise: a rapidly increasing number of scattered, independently owned community cable systems that pull in television signals and feed them by cable or microwave to paying subscribers who otherwise, because of location or topography, receive signals poorly if at all. CATV brings ETV, along with commercial programs, into distant places. Sometimes a cable company will present a school with free wiring and service as a public relations gesture. Robert Schenkkan, general manager of KLRN in Austin, Texas, discovered that the station had regular viewers miles beyond the normal viewing area when listeners in Del Rio, down near the Mexican border, sent in requests for Julia Child's recipes. The community antenna system that expanded the station's coverage also brought in subscribers to KLRN's in-school programs. And today San Francisco's KQED programs, owing in large part to CATV entrepreneurs, reach southward almost to Santa Barbara and north to the Oregon border.

A striking illustration of CATV capability is the flourishing educational "network" covering Michigan's remote Upper Peninsula, where there is not a single ETV station. Eighteen community antenna companies have linked together the closed-circuit system on Northern Michigan University's campus at Marquette with towns from one end of the Upper Peninsula to the other. The CATV systems there reserve one of their channels for educational use, with a standing offer to wire any school and install one connection free of charge. The network offers not only in-school programs but adult education and general cultural programing as well, including material from NET, MPATI, and the University of Michigan.

CATV's amazing growth has produced problems and controversy, especially in view of its long independence from FCC control. In 1965 the FCC moved to regulate part of the community antenna television industry, and in the spring of 1966 issued formal rules governing practically all forms of CATV. On balance, CATV's effect on ETV has been mainly beneficial

thus far. But while it has greatly extended the service areas of many ETV stations, it can threaten the very existence of some of the smaller stations by wiring in competitive ETV programs from powerful metropolitan centers.

The Technological Future

Of even greater promise to ITV's future than the use of one single technological innovation is the prospect of using the recent technological advances in combination. As Robert Hilliard, chief of the FCC's Educational Broadcasting branch, remarked recently:

In the next ten years these technological manifestations of television will be used less and less alone. Even now we have them in combination, where an ETV broadcast signal may be transmitted by a translator or ITFS system or CATV system, recorded, stored, then redistributed at a future time over a closed-circuit facility.

Today there is a refreshing change from the old rivalry of broadcasting vs. closed circuit. South Carolina, for instance, which pioneered in statewide closed-circuit service to the schools, now obtains greater coverage by sending its programs out to stations in Charleston and Greenville for rebroadcast, and is contemplating greater use of open broadcasting. Conversely Georgia, which is spending millions of dollars to construct an educational broadcasting network, looks toward the day when it may augment these stations with closed-circuit facilities. "Eventually," said Georgia's ETV director Lee Franks, "closed-circuit television, serving a single school or a cluster of schools, may provide all the hard-core instruction, and broadcasting may be taken up entirely by community programs of all kinds, including adult education." Pennsylvania State University, after ten years of intensive closed-circuit experience, launched into broadcasting in 1965 when it was assigned a new VHF channel for educational purposes.

Some experts predict the ultimate relegation of all in-school

and on-campus television to closed-circuit TV (including 2500 mc). This prediction is based on obvious channel limitations and on what may be overly optimistic estimates of the demand for in-school television and of the competitive demands on ETV stations for community programing of all sorts.

Others, especially veteran ETV station people, discount this view, maintaining that broadcasting, although it cannot provide the multiple channels needed for full school scheduling, provides certain vital elements for instructional television: professional skill and salutary public exposure. Jim Macandrew, New York City's Mr. ITV, also points out that in-school programs in art, music, and languages have built up a daytime audience among mothers, retired people, and night workers. Surveys show that the new ETV channels going into operation in the next decade will probably devote a much higher proportion of their budgets and broadcast time to instructional television than the average ETV station does now. Located in smaller towns than the present stations, these new stations will have fewer resources, depend more on income from schools, and have less money to spend on programing of their own.

One ingenious idea would exploit the videotape recorder to get the best of both transmission modes. It is for an ETV station to broadcast around the clock, twenty-four hours a day, using the hours from, say, midnight to 8:00 A.M. to feed taped lessons into school VTRs. Each school in the system could then distribute these programs throughout the school day to suit its own schedule. The station and its collaborating school systems could thus produce and transmit far more programs by using the nighttime hours that now go to waste. This scheme is being considered throughout the country.

Other kinds of combinations, too, may be of great assistance to ITV—for instance, television combined with computers, and the increased use of existing cable and microwave connections for all kinds of educational communication. The U. S. Office of Education has made a substantial grant to the NAEB to study the economics of an educational communications system, i.e., the use of one electronic "path" for a variety of services in a single system. Obviously, schools and colleges stand to gain if

televisions's expensive hardware can be put to work double and triple time for administrative purposes, testing, information retrieval, as well as for instruction.

But more important to education than full utilization of television's cables and microwaves is the use of television with other media in the instructional process itself. Dr. Hilliard reports that "television as an individual medium and in its various parts is being used less and less separately, and more and more in combination with other aural and visual techniques." A recent study reveals the growing trend toward planning closed-circuit facilities in schools and colleges as part of integrated audio-visual systems, in which television, teaching machines, programed texts, language laboratories, and other tools are combined in single automated teaching systems.

Such systems will be able to command a versatile array of components, among them video discs (television pictures via phonograph records), G. E.'s slow-scan TV, and single-concept films made possible by the inexpensive 8-mm. cartridge projector. By 1966 there were such ingenious variations as Westinghouse's "do-it-yourself" closed-circuit television system designed, at the behest of several Catholic schools, to allow a single teacher unaided to produce a program at will.

The immeasurable possibilities of communication satellites and other major technological breakthroughs have profound implications for education. Hard-headed educators and communication experts are discussing the prospect of a satellite for educational intercommunication throughout the United States, and even satellites shared with other countries for the world-wide exchange of instruction. A laser beam can transmit a thousand different television signals simultaneously. Satellites and lasers in combination open up boundless new possibilities.

The heads of the leading commercial networks are in substantial agreement that this development is imminent; they differ chiefly as to whether broadcasting via satellite will be direct to homes or by way of ground stations. The most eloquent spokesman for direct-to-home satellite TV, bypassing stations completely, is General David Sarnoff, chairman of RCA. "Within a decade, synchronous satellites, hovering in

fixed positions 22,300 miles above the equator, will transmit color television programs directly into the home, and the global audience will then run to a billion or more," he predicts. President Leonard Goldenson of ABC, however, believes that stations will be used to relay satellite TV. ABC has applied to the FCC for permission to put up a domestic satellite, inviting NBC and CBS to join in, and offering NET a band of its own. Goldenson has stated that ABC could have a satellite in operation in a year or less from the time permission is granted.

On August 1, 1966, the deadline set by the Federal Communications Commission for initial comments on ABC's application, the Ford Foundation presented a proposal for a nationwide system of synchronous satellites to distribute all TV programs, commercial and noncommercial, and to be run by a nonprofit corporation (Broadcasters' Non-Profit Satellite Service, or BNS).The crux of the idea is the use of satellite communications to permit "a revolution both in the technology and in the economics of television." The model, presented by the Foundation as "*one* way, not the *only* way" to bring about such a revolution, would in effect exploit the economies of satellite transmission to provide a substantial, steady income for educational television, gleaned from the millions of dollars that commercial TV would save in relay costs.

McGeorge Bundy, president of the Ford Foundation, urged the FCC to invite discussion "from the widest possible public" and to foreclose no possibilities. The new structure proposed would, he hoped, "make the desert bloom for whole new areas of television," including informational, cultural, and instructional services. First reactions to the Foundation proposal were vigorous and largely predictable. Opposed were the Communications Satellite Corporation (Comsat), and AT&T. Favorable and often enthusiastic comments came from a variety of sources: editors, educational broadcasters, the three major networks, educators. The immediate response indicated strong support of Mr. Bundy's plea to remedy the "depressing failure" of existing ETV, and to take no action "that would close the door to this new hope for all Americans."

Other National Developments

The NAEB's Project on the Improvement of Televised Instruction got under way in the fall of 1965 with a sizable grant from the Ford Foundation. The project is designed to help educational institutions throughout the nation improve the effectiveness of televised instruction. Teams of consultants are going into the field to answer calls from schools and colleges that want either to improve their use of television or to introduce it expediently. National and regional seminars are being convened to match the best insights available about the learning process to the highest potential of the television medium.

"Our mission is not to sell ITV," Lester Nelson, acting director, pointed out. "Our focus is not on what to do with TV as such, but how to improve the educational process with the help of TV."

Another notable nongovernmental development was the establishment in late 1965 of a national Commission on Educational Television, supported by the Carnegie Corporation of New York. It includes M.I.T.'s James R. Killian Jr., as chairman, and James B. Conant, Lee DuBridge of Cal Tech, Edwin Land of the Polaroid Corporation, and former Governor Terry Sanford of North Carolina. While the commission expected to focus on ETV services to the community in general, its work seemed bound to influence, if only indirectly, the in-school broadcasts of ETV stations.

Another development of incalculable importance is the entry into education of some of the largest and most imaginative corporations in American industry. Often the prelude is the merging of a major electronics corporation with a publishing enterprise; for example, Sylvania Electric Products and the *Reader's Digest* announced, early in 1966, the formation of a joint venture to investigate the potential of electronic systems in education. Previously, R.C.A. had acquired Random House, a New York publishing firm; I.B.M. bought Science Research Associates and signed a licensing agreement with Dun & Bradstreet; Xerox had purchased American Education Publications, Inc., Wesleyan University Press, and Basic Systems,

Inc.; and General Electric joined up with Time Inc. to form the General Learning Corporation.

Surveying these developments, Francis Keppel put forward the view, in *The Necessary Revolution in American Education*, that the new role of private enterprise in educational research, development, and distribution of new materials, was "comparable in importance to the expanding role of the federal government in education." Mr. Keppel subsequently resigned as Assistant Secretary of Health, Education, and Welfare to become board chairman of the General Learning Corporation.

The effect of these enterprises on instructional television is still to be seen. "These firms may get their feet wet by playing around on the fringes of education, for example in enrichment, as many educational broadcasters do, since this is the easiest to sell," commented Lew Rhodes, assistant director of the NAEB Instructional Television project. "But there's no reason to expect them to be content with that, when the challenge lies in direct instruction. I think in a few years these firms will be right in the mainstream of education, just as textbook publishers are now. They're efficient, they can use mass-market leverage to fund their research, production, and selling operations, and they can afford to hire the best people without the restrictions which hamstring educational producers."

These are some of the outstanding ITV developments on the national scene. There are many other important activities, too, less well publicized and smaller in scope. One is the cooperation among school people and broadcasters fostered by the many committees and compacts organized over the years to put school programs on the air. Another example is the Northeastern Regional Instructional Television Library project, which, under the direction of M. Virginia Biggy, sponsors joint curriculum planning and a continuing exchange of programing experience and ideas.

Yet another example is the tireless pursuit of excellence in ITV by Harold Wigren under the aegis of the National Educational Association. The impact of a modest gathering that the NEA brought together at Stephens College in the fall of 1964 is still reverberating among ITV people from Oregon to

South Carolina. The objective of the meeting, which Mr. Wigren chaired, was to explore the possibilities of using television to encourage inquiry, or discovery, in learning, a basic principle of many of the new curriculums. At the meeting, leaders in curriculum reform such as J. Richard Suchman and Joseph Schwab met ITV practitioners such as Elinor Richardson of the Los Angeles County schools, Raymond L. Smith of San Francisco, Dorothy Sinclair of Houston, June Dilworth of Seattle, Alan Stephenson of Boston (now Cleveland), and others who were intent on taking ITV out of its conventional mode and using it to help children learn to learn and think. Patricia Swenson's Portland project, for example, was represented by Peter Taylor, the studio teacher in a series Mrs. Swenson produced for the middle elementary grades called "Let's Explore Science." This ground-breaking series, reviewed around the country, has aroused great enthusiasm for its stress on evoking rather than overwhelming children's curiosity about the everyday world.

The confrontation at the Stephens meeting proved highly stimulating and a follow-up conference is being planned. Meanwhile, participants have developed model programs built on the inquiry principle, and have exhibited them at various educational meetings.

ITV and the Future of American Education

The future historian is quite likely to discover that the educational changes beginning with the second half of the twentieth century were two-fold: The rapid increase of technology in educational practice, and the concurrent re-examination and modification of the total educational program. Already the instruction provided by television and teaching machines is being subjected to more intensive scrutiny than much of the instruction it is designed to replace. The time is now ripe to examine the old as well as the new procedures, to be prepared to throw off some of the shackles which have bound the schools to the past, to introduce new and better ways, and become informed and competent guides to future progress.

WILLIAM CLARK TROW
in *Teacher and Technology;* 1963.

In 1961, Lester Asheim summarized the predictions of a group of outstanding ITV experts in a chapter appearing in *Educational Television: The Next Ten Years.* For the purposes of this report those same experts were asked in 1965 to update their expectations for the future on the basis of their experience in the intervening four years.

As it happens, the prophecies they made in 1961 about the status of TV in education circa 1971 still constitute an authoritative summary of future possibilities:

Educational television is an instrument of great potential value in improving the quality of education in all subject matters and at all levels—if it is used creatively and imaginatively . . .

Not every school, rural and urban, will have television by 1971, but probably every major *school, college and university will have at least one closed-circuit system, and there will not be many school children who will not have had some television in their educational experience . . .*

One certain development will be the use of ETV to provide teaching and demonstration in specialized subject fields . . . where teachers or equipment are in short supply.

While there may be some instances of 'total teaching' by television, particularly in the more routinized subject matters, the major use of television for more conceptualized content will be supplementary. This will not be only 'enrichment' in its narrower sense; there will likely be some large-group instruction as well. But television will be seen as an instructional tool, not as a replacement for good teaching.

Some adaptation of the Stoddard Plan will be typical: part of the day utilized in the large television class, and the rest in smaller-than-usual groups for discussion and socialization. The exact proportion in television and non-television classes is not yet determined, and certainly it will differ for different kinds of subject matter and at different levels. But the future will probably see something like 20 minutes out of the hour given to television at the elementary and secondary levels, and 30 minutes at the college level . . .

The greatest changes will be apparent in teaching method. ETV will spearhead the movement toward the better use of instruction materials of all kinds, with the emphasis not on the gadget but on communication. There will be a tendency for the discussion groups to be even smaller than the present classroom, with ability groupings to facilitate the discussion. The emphasis on ability groupings will lead to greater attention to the most able students, with greater reliance upon independent study and the development of responsibility for learning in the learner himself. . . .

Although in 1971 the normal road to the college degree is still likely to be residence instruction, it is not impossible that as much as 50 percent of the college degree program will be available for credit via television . . .

Airborne television may already be obsolete by 1971, with ETV from satellites accomplishing the kind of umbrella coverage airborne is now pioneering . . .

The wide audience served by regional systems and airborne television will represent a potential market for better and more

carefully chosen textbooks and other materials supporting ETV. Thus television could well be an important factor in improving textbook publishing.

School buildings will be much more flexible and adaptable, with portable soundproof partitions and similar features designed with ETV in mind . . .[5]

The second round of responses revealed disappointment in the lack of accomplishment to date. "Within the six years remaining of our original ten-year projection," wrote Vernon Bronson of the NAEB, "we will not accomplish all that was hoped to be accomplished by 1971 . . . It will be twenty or thirty years before the general educational system will really make maximum use of ETV and train its teachers effectively."

Perhaps the most impressive development that has occurred since 1961 has taken place outside the United States. As one respondent noted:

The acceptance of television as an effective medium for the improvement of instruction and the extension of learning opportunities has been strengthened in the United States by the contacts that our educators have had with educators in other parts of the world interested in this development. This has been enhanced by the meetings on in-school broadcasting in Rome and in Tokyo, which were enthusiastically attended by leading educators of dozens of nations. The formation of the Asian Broadcasting Union and its division on Educational Broadcasting has also been a significant factor in adding strength to the general use of television for education. The development of the instructional television system in American Samoa and the consequent rehabilitation of the entire school system of this American territory has established some guidelines that will affect the development of educational television in the years ahead in the United States as well as in the lesser-developed areas of the world.

To judge by the experts' answers in 1965, the movement toward the goals predicted for 1971 can only be judged spora-

[5] Lester Asheim, "A Survey of Informed Opinion on Television's Future Place in Education," *Educational Television: The Next Ten Years.* Stanford: Institute for Communication Research, 1962.

dic. There have been some promising advances in hardware, in cooperative production, and in storage and distribution of recorded materials. But in other areas where significant advance would have been expected, such as the refinement of the cross-media approach, the use of TV in new educational endeavors, and the emergence of a body of experts in instructional television, development has been slow.

The respondents predicted the continued growth in the use of TV for direct instruction; flexibility and eclecticism in the use of closed-circuit and broadcasting systems; greater and more reliable support for instructional television in school budgets; an increased number of expert practitioners; further reductions in the cost of ITV; and greater regional cooperation and federal support leading to higher quality. They expected to see libraries of videotapes and numerous special uses for ITV such as international conversations for language students via satellite, and preschool programs modeled on the lines of Operation Head Start.

Most respondents made one over-all point: that the limitations on the use of TV in education are due not to the medium itself but to a lack of imaginative boldness and talent in the people using it. The most hopeful portent for ITV lies, in their view, not so much in the prospects of massive federal aid or in new technical breakthroughs, but in the imagination and dedication of educators.

Throughout the country there is a feeling that ITV is marking time, that in the mid-Sixties the medium is at a critical turning point. In Boston, Hartford Gunn and his staff at WGBH brush aside "21 Inch Classroom's" enviable reputation as perhaps the nation's outstanding series of instructional programs. "Far too much ITV transmits no more than a fuzzy image of a teacher teaching in a traditional way, using the traditional and impoverished resources of the classroom," Gunn stated. "There is too little experimentation, and no rewards for it either. School people who try to use their imagination and bring the world into the classroom by TV have no way of tapping the resources they need. And the educational broadcasters don't know who these innovating people are."

In San Francisco, Raymond L. Smith observed that ITV now confronts a fateful temptation: "It has managed to achieve a certain acceptance in the schools, and I don't doubt it could continue to maunder along at its present level indefinitely, grinding out routine stuff that the schools will keep on using, not realizing how very routine it is." He has no use for such complacency. "Unless there is a marked improvement very soon in the quality of televised instruction, I think we'd all better get out of the business and abdicate to the film people, who do a much better job."

James Loper, director of educational services for Los Angeles' new KCET, and a representative of the new breed of trained educational communicators, endorsed the foregoing views of ITV: "The average KCET school program costs $1,000—peanuts! To get real quality, we should double or triple that amount—that is, if we really want to experiment with the process of teaching and try out new formulas. It's about time we got beyond televised instruction that makes 'no significant difference.' Precisely what we need are programs that *will* make a significant difference."

Ralph Steetle of the Oregon State System of Higher Education, who as director of the Joint Council on Educational Television played a leading role in launching ETV in the early Fifties, also warned of complacency in a June, 1965, address to an NDEA institute on educational media:

It is possible — I think it is probable — that the newer and initially unconventional methods of instruction have begun an untimely slip into routinely accepted patterns of conventional use.

In the early days of educational television, for example, the research studies compared results of teaching by television with conventional teaching. I wonder today if there has not grown up a body of information about the uses of television too quickly solidified by dependence on limited practice and tending to hold innovation to the levels of the recent past.

However, recent major developments encouraged Frederick Breitenfeld Jr. of the NAEB to state: "The focus seems to be

shifting from television to *education*. . . . As the novelty of television wears off in our daily lives, educational television becomes, as it should, a part of education, and not simply a form of television."

A picture of education in the year 2065 was painted last year by an educator skeptical of ITV, William Cartwright, head of the Department of Education at Duke University:

For a generation after 1950, school systems—even entire states and regions—tried to teach whole courses by television. Ultimately this costly experiment failed. It seemed promising for some time, and temporarily it improved instruction in many places, even though it damaged it in others. The improvement came because the television teachers often were better prepared than most classroom teachers and could call on better and more varied services. But as the general level of teaching improved and the public came to provide the facilities needed for good teaching, the disadvantages of the system led to its downfall. The major factor involved was that it proved impossible to apply what the educational scientists learned about the values of individualized instruction in a class in which all of the members were forced by a television set to move at the same pace. Another factor was the near revolt on the part of competent teachers and prospective teachers who said that there was no purpose in spending time, energy and money in preparation for teaching if they were not to be allowed to teach. In the fields involving controversy, the social studies and humanities, society came to realize the great danger inherent in a situation where any agency, public or private, can decide what should be taught to all persons.

Nevertheless, we have profited much from the great TV experiment. Almost all classrooms are equipped with television apparatus, even though it seldom carries live programs. As a result of the spectacular developments in technology, teachers can readily select, from vast repositories of films and tapes, programs or part of programs that fit in with their own plans and use them when they are appropriate.[6]

[6] William H. Cartwright, "The Teacher in 2065." *Teachers College Record,* Vol. 66, No. 4, January 1965.

And here is a brief look at the more imminent educational future by one of ITV's most outspoken champions, Raymond L. Smith of KQED:

A silently flashing board . . . your number comes up . . . you pick up your videotape from the library cart, step over to one of the soundproof cubicles in your classroom, deftly thread the tape onto the playback spool, push the "start" button . . . and there's your lesson on sea anemones on the TV monitor. Just routine. Nothing to it. Everybody does it. With the help of the teacher, Mrs. Thompson.

She knows all about you—your strengths and weaknesses in each subject—and somehow always seems to have the right tape for you just when you're ready for it. Same for everybody. In all subjects. Oh, you don't spend all day watching tapes; there's lots of regular class discussion time; muscle tune-up activities, too. Time goes fast. You're interested. . . .

Remember 1965 when you could hardly find an ITV program worth local *acclaim—not to mention regional or national? Remember the apathy of the teaching profession—especially school administrators and principals — when ITV was mentioned? Remember the stumbling of the teachers trying to invade the field of the professional broadcaster? Didn't they often look inept in the cold light of the classroom receivers? . . .*

As the vision for television emerged from the fogs of early pioneering, it became clear that only by organizing for production and distribution on regional and national levels could ITV be expected to reach its potential . . .

And what marvels these [production] centers have wrought! Compact, transistorized electronic units for production, combined with the computer technology for measurement and research have spawned a vigorous new species of videotapes, kinescopes (both 16mm. and 8mm. sound), LP recordings, audiotapes, filmstrips, photographs, attractively printed teachers' manuals, and a host of other related instruction materials.[7]

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[7] "TV as a Private Tutor: A Look Ahead to 1975." *National Association of Educational Broadcasters Journal,* Sept.-Oct. 1965.

More and more it appears that if television is to fulfill its potential for enhancing the educational process it will have to be used flexibly and imaginatively to encourage individual learning and it will have to take its place in an instructional system where the classroom teacher plays a new and critically important role as the director of learning. Tom Clemens of the U. S. Office of Education pointed this out in his comment that the kind of television that is needed will "enhance children's learning and their understanding of the world and themselves, contributing its own special attributes to the process of education. American education has to reorient itself to focus on *learning*, on what's actually happening to this kid or that kid. To do so, we'll have to stop using teachers like self-propelled tape recorders dishing out information, and we'll have to stop using instructional television as though it were radio — only you can see the announcer."

Such reorientation in the role of ITV means a shift in the emphasis on TV as an instrument of mass instruction. It is that, of course, and can, like film, bring into the classroom the widest possible view of reality. A documentary on civil rights, the international programs beamed from Telstar, Robert Frost reading his own poems, the unforgettable scenes of President Kennedy's funeral or Pope Paul VI's visit to the United States, the debate and teach-ins on Vietnam — it doesn't matter whether a student views these by himself or with five or six of his fellows or in a group of 100 or 500. But with instructional programs pinpointed in purpose, and with TV integrated into the classroom and made flexible, ITV could be used for individual as well as mass instruction, and for highly focused purposes in between.

Promising Next Steps

Subsidies from various sources have helped to launch ITV and to make it a recognized instructional tool. Support is now needed from government, business, and foundations to help ITV to move more rapidly into the mainstream of education.

Most ITV observers agree that the only way to overcome

limitations of time, talent, and money and still achieve first-class production of instructional programs is by pooling resources. Many believe the solution lies in regional centers serving several or even many states. Only a broadly based operation, they feel, can marshal enough money and talent to produce really superior programs.

This need for collaborative action that transcends state lines is critical. Thus far federal action on behalf of ETV and ITV, while it has encouraged statewide programs and statewide networks, has done little to encourage interstate networks or other forms of interstate cooperation. It is still too early to judge the effectiveness of the support pledged in the summer of 1965 at the Governor's Conference to a cooperative effort—the Compact for Education—to improve the quality of American education.

The following is a listing, selected mostly from informed opinion in the field, of promising educational activities that need financial support:

- TO AID IN MEETING THE EDUCATIONAL NEEDS OF PRESCHOOL SLUM CHILDREN: Television has great potential for enhancing programs of the Head Start variety. The possibilities inherent in color TV are especially inviting in this field. A pilot project could expand the relevant experience in commercial TV (e.g., "Ding-Dong School").

- TO IMPROVE EDUCATION IN THE PUBLIC SCHOOLS through cooperative production of superior televised instruction: A broadly based ITV production center, or centers, could be established beginning perhaps with one state, and then expanding across state lines to perform a regional service. The pilot project could build on the production facilities of one ETV station—Boston's WGBH, for instance, or Pittsburgh's WQED, or San Francisco's KQED—whose staff has had considerable experience in producing good in-school programs. The center could produce taped TV programs, classroom guides, and integrated instructional materials and might be tied in with the supplementary centers and services provided for in the 1965 federal school legislation. An important part of the proj-

ect would be to establish solid school support for the center, and to integrate the TV lessons and related materials into the curriculums. The center could exploit the opportunity to experiment with television and other media; it could be, in effect, a laboratory for ideas, unhampered by the practical obstacles that keep the average ITV enterprise from attempting the new and untried.

- TO IMPROVE THE TRAINING OF TEACHERS: A pilot project, related to the project suggested above, could be initiated to tie a joint school and university teacher-training program into the work of the production center. A trainee's clinical experience then would include a period of internship at the center as well as a teaching internship in the cooperating school system. The university could also work out, in conjunction with the production center, summer training and retraining programs for teachers in various fields, including the best use of the new media.

- TO HELP MEET THE EXPLODING DEMAND FOR POST-HIGH SCHOOL EDUCATION for students who are not going to attend a four-year college: A cooperative venture could be set up to exploit the experience (and perhaps the product) of the Chicago TV College. It could include crash courses to upgrade high-school teachers and industrial experts to provide the faculty for the two-year institutions.

- TO RAISE THE QUALITY OF COLLEGE AND UNIVERSITY INSTRUCTION during this period of exploding enrollments and scarcity of fully qualified faculty: College courses of high quality could be developed like those produced for "Continental Classroom" through intensive collaboration with college teachers in each subject, and workshops to ensure the best possible use of the televised lessons on the campus.

  A variety of single lectures could be produced and taped by eminent and gifted scholars, which could serve, as in the English universities, to stimulate independent study. By dividing the costs among several universities it should be possible to draw on the greatest names in the scholarly world: the Toynbees, the Bronowskis, the Oppenheimers.

Through cooperative arrangements among colleges and universities, instructional units—single programs rather than entire courses—could be produced. One major obstacle to the interchange of entire courses has been the classic reluctance of the scholars of one university to accept in toto the work done by scholars in other institutions. One solution might lie in the suggestion of Dean Jackson W. Riddle of the Ohio State University "to produce and deposit in videotape libraries units of instruction of varying degrees of complexity.... For example, if Professor X at University A, who is a renowned scholar in the area of photosynthesis, would develop instructional materials on this topic of his specialization, and if Professor Y at University B would develop similar materials on the DNA molecule (and so on), each of these individual units could be made available on loan for the construction of a course or courses, as desired."

Complete courses or single lectures could be produced, specifically designed to upgrade instruction in the smaller colleges that are at greatest disadvantage in recruiting faculty, in particular the predominantly Negro institutions. A model for this kind of enterprise might be the Moses Hadas lectures of 1963, supported by a grant from the Fund for the Advancement of Education, which brought superior instruction in the classics to four of these institutions via a two-way telephone communication system. A pilot project could utilize one-way video, two-way audio connections.

- TO HELP KEEP PROFESSIONAL PEOPLE ABREAST OF KNOWLEDGE IN THEIR FIELD: A collaborative project to produce and disseminate top-flight programs in the various professional fields could be initiated. This project might start with medicine, proceed to law, engineering, etc. Each project could begin by reviewing and then airing widely the best tapes available, to take advantage nationally of the excellent television courses produced thus far.

- TO TRAIN IMAGINATIVE LEADERS FOR THE ITV FIELD: A new breed of educational leader must be trained to unite the science of communication with educational insight. A

model program at a major university, in cooperation with a strong ITV production center, could serve as a prototype for adaptation throughout the country. The program could include internships at the production center.

- TO UPGRADE ESTABLISHED ITV LEADERS: A modest program of grants to ITV leaders, or to the ETV stations or school systems they work for, could be set up to supply adequate manpower to these chronically understaffed operations; to relieve talented and experienced practitioners from the grinding day-to-day pressures of producing programs, raising funds, and endless other duties; and to give these veterans time to think.
- TO ENCOURAGE PROFESSIONAL INTEREST AND ACTIVITY IN SIGNIFICANT RESEARCH: Grants could be made to selected professional groups concerned with television and other instructional media, for the purpose of supporting promising research, experiment, and evaluation in areas directly related to the improvement of instruction.
- TO INCREASE THE UNDERSTANDING OF TELEVISION TECHNOLOGY as it can be applied to improve education: A nonprofit agency (somewhat along the lines of the Ford Foundation-supported Educational Facilities Laboratories) could be organized to explore and publicize the best in instructional hardware, including TV equipment. One pilot project might work out ways to encourage the mass production of small, cheap TV receivers. For instance, a manufacturer could be assured of a huge market for sets in some developing country where the government was sponsoring a project to use television for education.
- TO PROVIDE ADMINISTRATORS WITH A PRACTICAL WAY TO GAUGE ITV COSTS: A study could be made to relate the costs of televised instruction to specific educational objectives, such as frequency and number of lessons, relation of televised courses to other media and to curriculum as a whole, etc., and to compare the cost of various media.
- TO CHART THE FUTURE COURSE OF INSTRUCTIONAL TELEVISION IN THE NATION'S SCHOOLS AND COLLEGES: A national commission, equal in stature to the Carnegie Com-

mission on Educational Television, could be set up to do for instructional television what that commission proposes to do for out-of-school educational TV (unless, of course, the commission enlarges its scope). The commission should include top educators, business and professional men, and scholars (especially in the behavioral sciences), and should focus not on ITV per se, but on the improvement of instruction at all levels through the wise application of the full range of educational media, including television.

To sum up: Instructional television is an educational tool whose basic effectiveness has been proved. But its ultimate contribution to improving teaching and learning in America's schools and colleges remains to be determined. Like any tool, the uses to which ITV is put and the results it achieves depend on those who work with it. On them also depend the usefulness, the variety, and the quality of televised instruction.

ITV seems likely to receive the resources that are needed to test its full potential. There is reason for measured optimism: the favorable attitude displayed by the federal and state governments, the developing technology, the emerging talents in the field—all may combine to help ITV overcome its present crisis of quality and assume its rightful place among education's most revolutionary tools.

The Fund for the Advancement of Education

is a philanthropic organization established in 1951 by the Ford Foundation to work in the field of formal education. Its chief activity has been the support of experimental programs that hold promise of advancing education in American schools and colleges. To date the Fund has been granted approximately $70 million by the Ford Foundation.